50 Years of Money and Finance: Lessons and Challenges

50 Years of Money and Finance: Lessons and Challenges

Edited and introduced by
Morten Balling & Ernest Gnan

Foreword by
Christian Noyer

Preface by
Urs W. Birchler

Chapters by
Niels Thygesen
Guonan Ma and Robert N. McCauley
William R. White
Christiaan Pattipeilohy, Jan Willem van den End, Mostafa Tabbae, Jon Frost and Jakob de Haan
Morten Balling and Ernest Gnan
Paul Atkinson, Adrian Blundell-Wignall and Caroline Roulet
Charles A.E. Goodhart
Donato Masciandaro and Marc Quintyn
David T. Llewellyn
Philip Molyneux
Patricia Jackson
Juan Ayuso and Roberto Blanco
William Arrata, Alejandro Bernales and Virginie Coudert

SUERF – The European Money and Finance Forum
Vienna 2013

SUERF 50th Anniversary Volume

larcier

CIP

50 Years of Money and Finance: Lessons and Challenges

Editors: Morten Balling & Ernest Gnan

Authors: Christian Noyer; Urs Birchler; Niels Thygesen; Guonan Ma and Robert N. McCauley, William R. White; Christiaan Pattipeilohy, Jan Willem van den End, Mostafa Tabbae, Jon Frost and Jakob de Haan; Morten Balling and Ernest Gnan; Paul Atkinson, Adrian Blundell-Wignall and Caroline Roulet; Charles A.E. Goodhart; Donato Masciandaro and Marc Quintyn; David T. Llewellyn; Philip Molyneux; Patricia Jackson; Juan Ayuso and Roberto Blanco; William Arrata, Alejandro Bernales and Virginie Coudert

Keywords: Chapter 1: Bretton Woods, EMU, EMS, surveillance. Chapter 2: Global imbalances, current account, capital account, saving and investment, international assets and liabilities, distribution of income; world banker. Chapter 3: Monetary policy, exchange rate regimes, monetary transmission mechanism. Chapter 4: Unconventional monetary policy, ECB, transmission, liquidity support, SMP. Chapter 5: Financial markets, financial theory, portfolio theory, regulation, Europe, models, liberalisation, deregulation, risk, substitution. Chapter 6: Capital market integration, interest rate parity, savings investment correlation, emerging economies, Foreign Direct Investment, capital controls, cross-border banking, bank interdependence. Chapter 7: Regulatory cooperation, BCBS, Basel I Accord, Basel II, financial crisis, Financial Stability Board. Chapter 8: Financial supervision, regulation, central bank supervision, governance, supervisory architecture. Chapter 9: Bank business models, ROE strategies, incentive structures, financialisation, equity capital, stock-adjustment phase, size and cost of the banking industry: Chapter 10: European banking, productivity, profitability, structure, revenue, cost & efficiency, competition, regulation, stability. Chapter 11: Shadow banking, new lending channels, non-bank banks, money market funds, finance companies, repos, securitization, covered bonds, growth factors, credit performance, risk assessment, financial stability. Chapter 12: Financial crises, financial market, euro area, institution framework, monetary union, subprime mortgages. Chapter 13: Derivatives, financial markets, equity options, commodity futures, Credit Default Swaps (CDSs), market expansion, speculation, volatility, CDS premia, bond spreads.

JEL Codes: Chapter 1: F33, F42, F55 and F65. Chapter 2: F15 and F32. Chapter 3: B22, E42 and E52. Chapter 4: E52 and E58. Chapter 5: B26, D53, E43, G15, G28, G38, K22 and N24. Chapter 6: F15, G15 and G21. Chapter 7: G20, G28 and L51. Chapter 8: E58 and G28. Chapter 9: G21. Chapter 10: D24, G21 and G28. Chapter 11: G23, G24 and G28. Chapter 12: G01, G18 and H63. Chapter 13: D84 and G13.

Vienna: SUERF (SUERF 50th Anniversary Volume) – September 2013

ISBN: 978-3-902109-69-9

Table of Contents

List of Contributors

William Arrata
Fixed-Income Portfolio Manager, Market Operations Directorate, Banque de France

Paul Atkinson
Former Deputy Director OECD Directorate of Science, Technology and Industry, Former Editor of OECD Economic Outlook

Juan Ayuso
Director, Monetary and Financial Studies Department, DG Economics, Statistics and Research, Banco de España and SUERF Council of Management

Morten Balling
Professor Emeritus, Department of Economics and Business, Aarhus School of Business and Social Sciences, Aarhus University and Managing Editor & Chairman, SUERF Editorial Board

Alejandro Bernales
Research Economist, Financial Economics Research Division (RECFIN), Banque de France

Urs W. Birchler
Professor of Banking, Department of Banking and Finance, University of Zurich and SUERF President

Roberto Blanco
Head of Division, Financial Studies Division, DG Economics, Statistics and Research, Banco de España

Adrian Blundell-Wignall
Special Advisor to the OECD Secretary General for Financial Markets, and Deputy Director OECD Directorate for Financial and Enterprise Affairs

Virginie Coudert
Economic Advisor, Financial Stability Directorate, Banque de France, and Visiting Professor at Université Paris Ouest - Nanterre la Défense (Paris X)

Jon Frost
Economist, Financial Stability Division, De Nederlandsche Bank

Ernest Gnan
Counsel to the Board and Head, Economic Analysis Division, Oesterreichische Nationalbank and SUERF Secretary General

Charles A.E. Goodhart
Financial Markets Group (FMG), London School of Economics and Political Sciences

Jakob de Haan
Head of Research, Economics & Research Division, De Nederlandsche Bank and Professor of Political Economy at the University of Groningen

Patricia Jackson
Head of Financial Regulatory Advice, EMEIA Financial Services Ernst & Young and SUERF Council of Management

David T. Llewellyn
Professor of Money and Banking, Department of Economics, Loughborough University and SUERF Council of Management

Guonan Ma
Senior Economist, Representative Office for Asia and the Pacific, Bank for International Settlements

Donato Masciandaro
Professor of Economics, Chair in Economics of Financial Regulation, Director, Paolo Baffi Centre on Central Banking and Financial Regulation, Università Bocconi and SUERF Council of Management

Robert N. McCauley
Senior Adviser, Monetary & Economic Department, Bank for International Settlements and SUERF Council of Management

Philip Molyneux
Professor of Banking and Finance & Dean of the College of Business, Law, Education and Social Sciences, Bangor University

Christian Noyer
Governor, Banque de France

Christiaan Pattipeilohy
Senior Economist, Economics & Research Division, De Nederlandsche Bank

Marc G. Quintyn
Chief, African Division, Institute for Capacity Development, International Monetary Fund

Caroline Roulet
Economist and Financial Analyst, OECD Directorate for Financial and Enterprise Affairs

Mostafa Tabbae
Statistician, Financial Stability Division, De Nederlandsche Bank

Niels Thygesen
Emeritus Professor, Department of Economics, University of Copenhagen

Jan Willem van den End
Senior Economist, Economics & Research Division, De Nederlandsche Bank

William R. White
Chair of the Economic and Development Review Committee at the OECD, Formerly Economic Adviser, Bank for International Settlements

Acknowledgement

The editors would like to gratefully acknowledge the support they have received in producing this book from the SUERF Secretariat based at the Oesterreichische Nationalbank in Vienna, particularly by Michael Bailey and Veronika Brookes.

FOREWORD

Christian Noyer[1]

It is both a pleasure and a great honour to contribute a few opening words to this book, which celebrates the 50th anniversary of la Société Universitaire Européenne de Recherches Financières, also known as SUERF – the European Money and Finance Forum. The past 50 years have indeed been very rich on all fronts regarding monetary and financial affairs and the current circumstances require, more than ever, insights on structural change in monetary institutions and the interplay of financial innovation and financial regulation.

Our economic, political, technological landscapes today have very little to do with what they were in 1963, or even, for that matter, twenty years ago:

Exchange rates were fixed within the Bretton Woods system; capital controls were the rule and European monetary integration would first appear as a remote possibility in the 1969 Werner Report.

Throughout half a century of major evolutions of monetary institutions and transformation of the financial system, the SUERF, which has over 300 active members, has managed to spur an indispensable dialogue between economists, financial practitioners, central bankers and academics for the analysis and mutual understanding of monetary and financial issues. I am proud to stress that Banque de France has participated intensively in all the activities of SUERF and, actually, SUERF repeatedly helped us as many other institutions, to decipher economic and financial developments in order to best serve our fellow citizens.

This book analyses the main trends in the economic history in money and finance of the past five decades. It provides a rare combination of scope and depth with analyses of prominent economists, many of which have been or are still in charge of conducting monetary or regulatory policies in central banks or international organisations. The book is an occasion for them to take a step back and share with the reader a unique blend of analyses that are grounded in the constraints of real world policy making. In this sense, the book very much reflects the essence of SUERF.

The book covers an impressive scope, including global and European monetary institutions, macroeconomic imbalances, central banking, unconventional monetary measures, financial activity of industrial countries, the financial and economic integration, European and global financial regulation, the evolution of

[1] Governor, Banque de France.

financial supervision, the developments of the bank business model, the performance of European banking, shadow banking and new lending channels, the origins and handling of financial crises, and the development of derivatives markets. The book is policy-oriented, practitioner-friendly and provides new insights, with a European focus, although the analysis is embedded into the global dynamics of economic developments and thinking. It will become a landmark that many of us keep on a shelf close to their desk and go back to regularly to learn again and again from its invaluable insights.

PREFACE

Urs W. Birchler[2]

Financial practitioners and academics with an interest in money and finance have often different perspectives on the world, but a lot to learn from each other. This vision, in May 1963, inspired two pioneers, Professor *Pierre Tabatoni,* University of Paris and *Jacques Branger,* Director General of the Caisse Nationale des Marchés de l'État, to invite a group of European financial practitioners and academics to discuss the possible formation of a European Group for Financial Research. At a small conference in November 25, 1963 *Société Universitaire Européenne de Recherches Financières, SUERF* was formally established. *Alexandre Lamfalussy,* a Senior Official of Banque de Bruxelles in Belgium, participated in the conference and was later appointed the first Honorary Treasurer of SUERF. In 1969, central bankers joined to form a third – and strong – "pillar" of SUERF.

This 50th Anniversary Volume differs strongly from the approaches taken by two publications published to commemorate previous SUERF anniversaries. In 1993, *Stuart Wilson*, (SUERF President 1973-6) authored a pamphlet sent out to members, "intended as a personal mémoire, rather than a definitive history of SUERF as an association", to coincide with SUERF's 30th anniversary. He had originally been approached by *Mario Monti* (during his term as SUERF President) to commemorate SUERF's 20th anniversary, but had declined to publish such a publication until after he had stood down from the Council of Management. The resulting publication catalogued places (venues for Colloquia and other SUERF events), people (prominent speakers, members of Council), and a potential vision to be pursued in the future (in particular Wilson suggested how the countries of Central and Eastern Europe could be incorporated into SUERF's activities).

In 2003, to mark the Association's 40th Anniversary, a special anniversary volume "Monetary and Financial Thinking in Europe: Evidence from Four Decades of SUERF", was produced. *Jean-Paul Abraham,* (SUERF President 1994-97), collected and examined the choice of topics in the twenty-four SUERF Colloquia held between 1969 and 2003. The volume contains quotations from the Colloquium books and from speakers, authors, Commission chairmen and participants contributing to the discussions. At the 40th Anniversary Seminar held in Paris in Banque de France's Galérie Dorée, Jean-Paul Abraham spoke and was praised for the Herculean task he had done to document the working of SUERF as an active network between financial economists, financial practitioners,

[2] Many thanks to Michael Bailey for help in preparing this preface.

central bankers and academics for the analysis and mutual understanding of monetary and financial issues.

This present volume deals considerably with the evolution of issues in money and finance in Europe over the last 50 years, and also looks to the future. The remit given to the authors of the individual chapters was to take the events and issues of the past 50 years (albeit with particular emphasis on the post-2007 period) in order to be able to draw conclusions for the future. The volume aims to identify the main trends in international financial markets, in global and European macroeconomic balances, in European financial integration, in central banking, in banking and securities markets, in financial innovation and the origins and handling of financial crises. The focus is both policy-oriented and practitioner friendly. Both individually, and as a whole, the contributions are intended to provide new insights to the readers. Similarly, while the focus of the volume largely reflects SUERF's European nature, it tries to also examine the global evolution of economic thinking and economic developments since the early 1960s.

In the Spring of 2012, the SUERF Council of Management asked *Morten Balling,* SUERF Managing Editor, and *Ernest Gnan*, SUERF Secretary General, to be editors of the anniversary volume. The Council also decided on a list of distinguished researchers who should be asked to use their expertise to write chapters for the volume. During the summer of 2012, the invited authors accepted to contribute.

Pleasingly, many of the authors of this volume will also speak at the special conference to be held at the Banque de France in Paris on 22nd November 2013, which addresses the topic of "The Financial Reconstruction of Europe" – since the topics they cover in this volume continue to dominate the agendas of researchers, financial market practitioners and policy-makers alike.

On behalf of SUERF, I would like to thank all the authors for their excellent work. At the same time we would like to express our gratitude to all individuals and institutions who contributed to SUERF's endeavours for their generous support.

Zurich, June 2013

Introduction

Morten Balling and Ernest Gnan

"Those who cannot remember the past are condemned to repeat it."
Baruch de Spinoza, 1632-1677

In November 2013, SUERF – The European Money and Finance Forum – celebrates its 50th Anniversary in Paris. In the Spring of 2012, the SUERF Council of Management decided to mark the coming anniversary by publication of a volume "50 years of Money and Finance: Lessons and Challenges", in which a group of distinguished researchers were asked to look at the monetary and financial history of the past 50 years, to summarise the most important trends and experiences and to draw conclusions for the future. In the spirit of Spinoza, the Council wanted to select a group of highly qualified persons that could help us to remember and understand the past and on this basis recommend improved policies to meet the challenges of the future. Authors were asked to identify main trends in international financial markets, in global and European macroeconomic (im)balances, in European financial integration, in central banking, in banking and securities markets, in financial innovation and in the origins and handling of financial crises. The text should be policy-oriented and practitioner friendly. Authors should cover path-breaking events, political decisions, and relevant outstanding research contributions in the field since the early 1960s.

In Chapter 1, *Niels Thygesen*, Professor Emeritus of International Economics, University of Copenhagen analyses the very significant changes that have occurred in global and European monetary arrangements since SUERF was founded in 1963. At the beginning of the 50 year period, the attention of European policy makers was to a large extent focused on improving the functioning of the Bretton Woods fixed exchange rate system. Gradually the system eroded as doubts regarding the sustainability of an international monetary system based on one national currency – the dollar – became widespread. The growing Atlantic imbalances and the privilege of the United States through the country's ability to borrow substantially abroad in its own currency to finance persistent current account deficits were criticised particularly by France. In August 1971, President Nixon broke the link of the dollar to gold. In March 1973, fixed exchange rates for the dollar were abandoned by most IMF member countries, and in October 1973 OPEC announced a decision to raise the posted price of oil by 70% with far-reaching implications for global imbalances. The creation of respectively the European "Currency snake" (1972), The European

Monetary System (EMS) (1979) and the EMU (1999) should all be evaluated in the light of the global trend towards floating and more volatile exchange rates. Besides, the internal European ambitions were growing with the perception that a single market for goods and services ultimately required a single currency. With the 1992 Maastricht Treaty, Europe went much further than any defensive response to global currency instability required. In EMU, monetary policy is centralized. Fiscal policy is not. The Stability and Growth pact failed to provide fiscal discipline. In addition to imbalances between the European countries, sovereign debt problems grew. Recently, major repair work on the policy rules and on the effectiveness of surveillance has been performed by the Commission and the Council of Ministers, often under the prodding of the European Parliament and the ECB. The author gives an overview of the repair work in the form of tightening of SGP procedures, the fiscal compact, the European Stability Mechanism and improved procedures for crisis management. He concludes that in the period considered, the primary inspiration for Europe's monetary arrangements has been internal rather than global.

In Chapter 2, *Robert N. McCauley* and *Guonan Ma*, BIS look at global and European macroeconomic imbalances. Global imbalances conceived in net terms often lead to discussions of the biggest pair of current accounts with opposite signs: US-Japan in the 1980s and US-China in recent years. In the chapter, the authors instead focus on the first and second largest surplus economies, which are also the second and third largest creditor countries, China and Germany. Both countries produced in the 2000s a current account surplus that the world (China) or Europe (Germany) found difficult. The sources of the surpluses were more similar than usually considered. Their recycling started out very differently but, with the euro crisis, has converged to some extent. The role of policy in the two surpluses is more complex than often thought. The authors find also important differences. German banks not only lent euros to banks and sovereigns in the periphery of Europe, running deficits against Germany. They also on a large scale bought risky US mortgage-backed securities, financing the US deficits and debt against the rest of the world. The risk appetite of the Chinese authorities and bankers has been much smaller. China has systematically allowed foreign investors to take equity risk in the Chinese economy, while mostly confining its dominant official investment to safe assets denominated in major reserve currencies. In a global recession, this portfolio produces steady income and even capital gains on the safe assets. In recent discussions about the need for surplus countries to take action to reduce their surpluses, it has been argued that China's surplus is the result of Government policy and therefore unacceptable internationally, while that of Germany is the result of private decisions and therefore must be accepted. The strength of this argument must be evaluated with critical eyes.

In Chapter 3, *William R. White*, former Head of the Monetary and Economic department, Bank for International Settlements, poses the question: "Is Monetary Policy a Science? In the view of the author, the practice of monetary policy is far from science. Structural changes in the economy have changed the conduct of monetary policy. In addition, there have been significant changes in 'accepted' economic theory over the last fifty years. Central banks have gradually relied more on the operations of free markets and management of inflationary expectations. Choices of exchange rate regimes, monetary policy frameworks, and operational procedures have evolved since the 1960s. All monetary authorities must face Mundell's "Impossible Trinity": A country cannot simultaneously have free capital flows, a fixed exchange rate and an "autonomous" monetary policy. The Bretton Woods system gave priority to fixed (but adjustable) exchange rates and to the autonomous conduct of domestic monetary policy. So, some impediments to capital flows were accepted. Gradual liberalisation of capital movements contributed to the break-down of the Bretton Woods System in the early 1970s and implied that fixed exchange rates were abandoned. Later, highly volatile capital flows caused currency crises in Asia, Latin America and Russia. Taken together, these experiences indicated that both floating and fixing have their associated dangers. By creating the EMU, the member countries in fact gave up "national monetary policy" in the expectation that the single currency would give impetus to the establishment of a Single European Market. Some countries have tried to solve "The Impossible Trinity" by using a constrained version of all three elements. They have combined managed float, managed capital flows and a form of constrained monetary policy. Advanced market economies and emerging market economies follow very divergent exchange rate policies and that is why some observers have called the present situation in global currency markets a "non system". Some central bankers have become increasingly uneasy about the analytical framework, they had previously relied upon. None of the macroeconomic models in wide spread use before the 2008-2010 crisis predicted it. Alternative lines of macroeconomic and monetary research are now being pursued. There are grounds to believe that the political framework constraining the conduct of monetary policy will change. Some blending of rules and discretion has evolved. It is possible that the crisis could swing the balance towards discretion. In the early 1990s, a number of central banks adopted explicit inflation targeting regimes. In the 1980s, macroeconomic problems building up under the "Great Moderation" were ignored. The author uses the expression "growing hubris". It has been argued that a higher degree of transparency about the future use of monetary policy instruments might not contribute to financial stability.

In Chapter 4, *Christiaan Pattipeilohy*, *Jan Willem van den End*, *Mostafa Tabbae*, *Jon Frost* and *Jakob de Haan*, De Nederlandsche Bank analyse the use of

unconventional monetary policy by the ECB. They first provide an overview of conventional monetary policy. The period 1979-82 came to be known under the general title of "Practical Monetarism". Policy makers focussed on the growth of M1 and M2 with a view to reduce inflation. From 1983 to 1992, many European countries made maintenance of their exchange rate peg to the Deutsche Mark (DEM) the centre-piece of their monetary policy. After 1992, there were serious crises, which boosted the idea to introduce a common European currency. Since 1999, the Governing Council of the ECB is in charge of monetary policymaking in the Euro area. The Maastricht Treaty made price stability the ECB's primary objective. The ECB uses a "two-pillar" strategy based on monetary analysis and economic analysis. A focus on money growth (M3) has been motivated by the view that inflation in the long run is considered to be a mostly monetary phenomenon. In contrast to ECB, several central banks opted for inflation targeting. ECB's conventional instruments are standing lending and deposit facilities and open market operations.

ECB and other central banks in industrialised countries have broadened their assortment of monetary policy instruments over the past few years. Conventional instruments have been supplemented by unconventional measures where central banks use their balance sheets to affect market prices and conditions beyond short-term interest rates. As a consequence of the use of unconventional measures, central bank balance sheets have expanded substantially. In order to document the impact on balance sheet composition, the authors compare changes in balance sheet indicators from 2006 to 2011 for a sample of central banks. One important observation is that most central banks converge towards a more balanced ratio between the public and private sector debt they hold. Another observation is that the ratio between domestic and foreign assets shifted in opposite directions depending on whether the central bank was focused on stabilising the exchange rate or primarily had the domestic financial or fiscal development in mind. After 2008, the ECB adopted respectively the Enhanced Credit Support programme, the Securities Market Programme (SMP) and Outright Monetary Transactions (OMTs). The authors provide an overview of studies of the effects of ECB's unconventional monetary policy. Finally, they present new evidence on the effectiveness of this policy.

In chapter 5, *Morten Balling,* Aarhus University and *Ernest Gnan,* OeNB provide a survey of trends in financial markets, European regulation of organised financial markets and the development of financial theory. Since the 1960s, there has been a remarkable interaction between financial theory and financial practice. Academic research has stimulated financial innovation and led to the development of new financial instruments and markets. Important research areas are portfolio theory, capital asset pricing theory, interest rate structure theory, capital structure theory, agency theory, efficient markets theory and option

pricing theory. Milestones within these fields are identified and their contribution to the complexity of instruments and risk measurement and possible relevance in relation to the financial crisis after 2008 are discussed. In charts, the authors describe the growth and the most important structural changes in financial markets. The roles of different financial instruments have changed considerably in the last decades. After 1999, the development of European regulation of financial markets has taken place within the framework of the Financial Services Action Plan (FSAP) and followed the so-called "Lamfalussy Approach".

In Chapter 6, *Paul Atkinson, Adrian Blundell-Wignall* and *Caroline Roulet*, OECD discuss integration versus interdependence and complexity in global trade and finance in the post-war period. Since the early 1960s, there has been a trend of both increasing integration and increasing interdependence. Within the OECD countries, Europe was the early mover in the trend towards greater integration. By 1968, a full customs union was established in the EEC. Trade liberalisation proceeded more slowly at the global level. However, successive GATT rounds contributed to expansion of trade globally. Capital account deregulation was less rapid as documented by the experience with the OECD codes of liberalisation of capital movements. Interest rate parity data can be used as measures of integration of financial markets. So can correlations between national saving and investment. The changing degree of openness is studied by regression analysis. The overall trend in the saving-investment correlation is downwards but with interruptions in crisis periods. Western Europe appears to have led the world also in the opening up foreign direct investment. China and some other Asian countries have followed policies to manage exchange rates at undervalued levels. These policies impact on external imbalances. Financial market deregulation proceeded in parallel with the opening of trade and capital markets. This led to a greater integration of banking activities across countries. In the 1960s and 1970s banking integration was centred on the development of the Eurodollar market. Since the early 1990s, a considerable cross-border banking activity was focused on Central and Eastern Europe. After the 2008-2010 crisis many banks have been pulling back from foreign subsidiaries and branches. The authors use a global bank beta based on bank stock prices as a measure of interdependence. The beta tends to increase in crisis periods. OECD has carried out an empirical study of the determinants of distance to default covering 94 global banks. The study concludes that leverage, exposure to derivatives and dependence on wholesale funding are crucial factors. The authors recommend that the current Basel framework should be scrapped in favour of something vastly simpler, that capital requirements to banks should be strengthened, that implicit guarantees to too-big-to-fail banks should be limited and that corporate governance of banks should be strengthened.

In Chapter 7, *Charles A.E. Goodhart*, London School of Economics, gives an overview of the trend since the early 1960s from national towards European and global financial regulation. At the beginning of the period under study, banking in Europe was almost totally national in character. There was little exposure of European banks to the outside world. In this fragmented, nationally-based context, regulation and supervision could, and did, develop separately in each country. There were few bank failures and no bank crises between 1945 and the 1970s. During the cold war, institutions from the Communist countries began depositing dollars with European banks, especially in London, and the euro-dollar market grew up in the 1960s and the 1970s. The internationalisation of banking and the growth of the Euro-currency market were stimulated by national controls and regulations. Under Regulation Q with ceilings on interest rates in the USA, banks in the Euro-currency market had an interest-rate advantage in attracting dollar deposits. So the late 1960s and early 1970s saw an influx of branches and subsidiaries of US banks into most West European countries. The internationalisation of banking became a matter of increasing concern for the European supervisors. After the quadrupling of oil prices in October 1973, the oil producing countries received huge inflows of dollars which were mostly placed as deposits in the euro-dollar market. This development led directly on to the question of what the relative responsibilities of the home, and host, supervisory authorities respectively for the solvency and liquidity of foreign banks should be. Against this background, the author gives an account of the formation in 1974 of the Basel Committee on Banking Regulation and Supervisory Practices, later shortened to Basel Committee on Banking Supervision (BCBS). The first job of the BCBS was to sort out the relative responsibilities of home and host supervisory authorities for the subsidiaries and branches of foreign banks. In the BCBS there was no consensus on the best definition of capital, or on its appropriate ratio to assets. After difficult negotiations, a compromise – the Basel I Accord – was reached in 1987 and introduced in 1988. By the middle of the 1990s, BCBS had become the quasi-official financial rule-making (regulatory) body for banks throughout the world. It became practice that EC Directives transcribed positions agreed within the BCBS. The Achilles heel of the Basel Accords has lain in the conceit that the authorities could ascribe (constant) relative risk weights to various bank assets. It was decided that the sovereign bonds of all OECD countries should be treated as riskless. In the mid to late 1990s, the analysis of risk was becoming more quantitative and supposedly more "scientific". Value at risk measures (VaR) were accepted by regulatory authorities who overlooked that these measures were designed to tell the top management of banks how risky its own portfolio was currently. The greater reliance on VaRs and bank-based measures of risk, in Basel II than in Basel I, and the increasing use of mark-to-market valuation made the whole system more procyclical. The regulators failed to realise that a procedure developed for private sector

commercial purposes was inappropriate for public and social regulatory needs. In the view of the author, the recent crisis was due to a bet that housing prices would continue to rise, or at least not fall sharply. Most members of the economic community were complicit in that. Regulation has become, to some extent, global under the aegis of the BCBS. Enforcement of regulation and supervision, however, remained national. The global system is under increasing threat. The financial crisis has caused a fragmentation of banking back towards a strong national focus, especially in Europe. The eurozone crisis is ongoing. The future of Europe, and of its banking system, remains uncertain and at risk.

In Chapter 8, *Marc Quintyn*, IMF Institute, and *Donato Masciandaro*, Bocconi University provide an overview of the evolution of financial supervision. They describe the development of supervisory structures in the last decades by means of milestones. Reforms of the architecture of financial supervision have historically been driven by liberalisation, international financial integration and by experiences from crises. Gradual blurring of boundaries between countries and markets has made changes in the architecture and strategy of financial supervisors necessary. Growing international financial integration and the formation of large financial conglomerates created a need for reforms of the supervisory architecture. The authors classify models of the architectures into 1) "silo models" with separate agencies for supervision of banking, securities and insurance, 2) "unified models", where one single authority covers all market segments, 3) "(twin) peaks models", which groups supervision aimed at preserving systemic stability in one peak, and the conduct of business supervision in another, and 4) "hybrid models" with some supervisors monitoring more than one market segment and others only one segment. In a sample of 102 countries, each of the three first models have been chosen by approximately a third, while very few countries have chosen hybrid models. Countries also differ regarding the role of the central bank in supervision. According to the "integration view", a high central bank involvement is desirable, while the "separation view" based on moral hazard, distorted incentives, capture risk etc. provides arguments for keeping central bank involvement in supervision at a low level. The diversity of supervisory arrangements in the world reflects the fact that no consensus has been reached. After observing the unsatisfactory role of supervision during the global crisis, the authors also arrive at the sad conclusion that all the reforms and the hoped-for improvements in the effectiveness and the incentive structure for supervision did not work. In their conclusion, the authors compare the search for effective supervision with the search for the Holy Grail. In their view, it is probable that it will never be found.

In Chapter 9, *David T. Llewellyn*, Loughborough University, gives an overview of the development of bank business models over fifty years. The components of business models are the range of business undertaken, the banks' ultimate business

objectives, balance sheet management strategies, type of intermediation business and the banks' response to regulation. The period preceding the crisis was characterised by intensive financial innovation, substantial rise in the volume of trading in complex derivatives, growth in the value of financial assets and liabilities relative to GDP, a more market-centric structure of financial systems, increased inter-connectedness, emergence of a shadow banking system, globalisation, a rise in gearing, more reliance on wholesale markets for liquidity and funding and diversification of banks into different business areas. The author compares the traditional model of a bank with a securitisation variant and a model with use of credit default swaps (CDSs). Countries in which banks stuck to the traditional model came through the crisis largely unscathed. New business models changed the nature of risks. The use of credit-risk-shifting instruments exposed banks to low-probability-high-impact risks. Reward structures produced a bias to excessive risk taking. Growth of securitisation and structured investment vehicles induced an over expansion of banking business and unrealistic perceptions of risk. The degree of "financialisation" became excessive and unsustainable. Partly as response to regulatory requirements, capital (equity) ratios in European banks rose in 2011 and 2012. This was brought about by some capital injections but mainly by a reduction in risk-weighted assets. Recent bank strategies include lower degrees of maturity transformation, retreat from cross-border business, increased dependence on ECB funding and reduction of the number of employees. There might in the future be a reversion to the more traditional bank model with less reliance on volatile wholesale funding sources and with implementation of reward structures without incentives to take high risks. The range of business undertaken by banks may be restricted in accordance with the recommendations about "ring-fencing" in the Vickers and Liikanen reports.

In Chapter 10, *Philip Molyneux*, Bangor University analyses performance in European banking as measured by productivity, profitability and employment. The number of banks has fallen over time with a general increase in concentration. In the 1960s, banking systems were still mainly national and segmented, and commercial banks focused on business customers. Mutual banks, of one form or another, were the main providers of personal financial services. An important financial sector liberalisation driver was the EU's First Banking Directive of December 1977 that started a programme of EU legislation aimed at reducing barriers to cross-border banking activity. From the mid 1980s, deregulation at the national level eliminated many of the lines of demarcation between banks and other financial service providers, and helped facilitate cross-border competition. In order to realize scale and scope economies and spread risk through product or geographic diversification, many European banks took advantage of the new opportunities often through mergers and acquisitions. By the end of the century, significant progress had been made towards creating a

fully integrated single market in banking and financial services in Europe – in particular in wholesale banking. The implementation of the EU's Financial Services Action Plan between 1999 and 2004 provided greater EU wide integration in the banking system, and increased the inter-connections between cross-border financial institutions. Technology revolutionized delivery systems and led to use of different business models. The author presents for the period 1985 to 2011 structural indicators for the banking sectors of the EU-15 countries. Banking sector concentration ratios have increased in the majority of EU countries. Competition intensified and drew down margins. This encouraged banks to supplement their income by diversifying into non-interest income areas such as insurance and securities underwriting. The literature investigating the development of the productivity of European banks has provided mixed results. There has been substantial variation in the average profitability of banks located in different EU countries. The financial crisis first affected European banking in the summer of 2007. From 2007 to 2010, the largest European banks reported huge credit losses, and received massive capital injections. We have seen a wave of government-backed bank bailouts, recapitalization plans, liquidity injections and credit guarantee schemes. Governments and their respective regulators have moved rapidly to close the gaps and weaknesses in the system for bank regulation and supervision. It is unclear as to what the ultimate impact of the ongoing regulatory reforms will be on the performance of European banks – although it seems likely that the reforms will lead to a more conservative and less competitive system.

In Chapter 11, *Patricia Jackson*, EY, United Kingdom analyses shadow banking and new lending channels. Shadow banking has caused or been at the heart of various financial crises in different periods and one important factor behind its growth has been the style and extent of bank regulation. In the 1970s and 1980s the growth in shadow banking tended to be related to property lending and, even though it was not complex, the crises were sufficiently severe to require central bank or government intervention. The 1990s steadily saw more and more complex structures being used in shadow banking peaking in 2007/2008 and being central to the financial crisis. The development of UK fringe banks and US savings and loans institutions was stimulated because their activities were outside any banking supervision or more lightly regulated than banks. In the USA, the role of money market funds grew fuelled by the attraction of what were perceived as riskless demand accounts paying yields above risk free rates. During the 2008 crisis, money market funds fell into difficulty. A run only stopped when the Government stepped in with a guarantee. A variety of different types of finance companies grew up over the 1980s and 1990s. They provided loans to consumers and companies and funded themselves to a large degree from wholesale money markets. Some shadow banking issues are related to reverse repurchase

agreements (REPOs). Basel I provided clear incentives for regulatory arbitrage. It encouraged the use of securitization to alter the risk profile of banks' portfolios relative to the capital being carried. Special purpose vehicles (SPVs) were treated as legally separate from the sponsoring bank and therefore not consolidated into the bank's financial statements and regulatory reports. The author explains by means of diagrams the use of different securitization structures, originate to distribute models for mortgages, issues of asset backed securities (ABSs), collateralized debt obligations (CDOs), rated mortgage backed securities (RMBSs), credit default swaps (CDSs) and structured investment vehicles (SIVs). Banks held large blocks of these opaque instruments in the form of off-balance sheet vehicles, and it was this extremely complicated nexus of exposures which fuelled the solvency problems at the heart of the crisis once the value of the securities started to be marked down. European securitization activity has been severely constrained post crisis. Regulatory uncertainty contributes to the current pressures on the European banking industry. Deleveraging provides new opportunities for shadow banks. There are several ways in which institutional investors can expand their lending activities. The author explains the structure of investment fund vehicles and uni-tranching. Other forms of shadow banking are receivables exchanges and peer to peer lending. All types of credit intermediation have to deal with information asymmetries between the borrowers and lenders. Mechanisms for management of credit risk are essential. There is a risk that problems of opacity and interconnectedness will again ensue. The future balance between shadow banking and banking is uncertain.

In Chapter 12, *Juan Ayuso* and *Roberto Blanco*, Banco de España analyse financial crises. The economics profession seems to have an unfortunate tendency to time myopia. If observers look only at the latest data, they lose the experience and the lessons from financial crisis that have taken place many years ago. Most crises have common features, which the passage of time tends to blur. In the chapter, the authors argue that the crisis in the Euro zone after 2007 is special in the sense that the countries involved are parts of a monetary union that was not designed to deal with any kind of crisis. The institutional set-up of EMU was not well-equipped to prevent the accumulation of vulnerabilities. The elimination of exchange risk and the integration of financial markets contributed to the underpricing of risk. When the crisis hit, policymakers reacted quickly and decisively. In addition to fiscal stimulus programmes, their partially coordinated actions also included measures in the financial arena. The coverage of deposit guarantee schemes was extended, interest rates were cut, non-standard monetary policy instruments were introduced, bond purchase and securities market programmes were implemented and government guarantees and public capital injections were applied. The crisis has underscored the need for a deep overhaul of the governance of the euro area. Promising steps have already been taken.

In Chapter 13, *William Arrata*, *Alejandro Bernales* and *Virginie Coudert*, Banque de France, give an overview of the development of derivatives markets. They focus on three main categories of derivatives: equity options, commodity derivatives, and credit default swaps (CDS). The option markets have been growing since 1973, after Black and Scholes found a straightforward formula to price them. Commodity futures have also happened to soar since 1973, as the oil crisis introduced instability in energy markets. Credit derivatives have been developing fast since the beginning of the 2000s in line with the securitization of banks' loans. Derivatives were initially designed for hedging purposes, but they are also widely used by speculators. They therefore raise issues for financial stability. Derivatives markets may have taken the lead over their underlying markets in the price discovery process. The authors study the relationship between option listings and their impact on asymmetric information. Equity options can improve market efficiency by decreasing transaction costs and market risks. The oil crisis in 1973 raised the volatility in oil prices and boosted the market for oil derivatives. The volume of commodity derivatives market transactions on OTC and organized markets largely exceeds that of physical market transactions. The authors give an overview of the long discussion of the role of financialisation of commodity derivatives markets in market volatility. They end up by recommending efforts to reduce financialisation through increased market regulation. CDSs are over-the-counter instruments designed to protect bondholders against the risk of borrowers' default. They can, however, also be used to speculate. The CDS market soared from the beginning of the 2000s up to 2008, its notional amount reaching USD 58 trillion. The market expansion included sovereign CDS markets, and the differentials in sovereign CDS indices were used as measures of the tensions in the Euro area. Bond and credit default swap spreads have been particularly high and volatile since the onset of the 2008 crisis. The notional amount of outstanding CDSs has declined substantially since 2008. At the end of 2012, the notional amount was about USD 25 trillion.

The ambition of the present 50 year anniversary volume was to bring together the contributions by a group of outstanding observers and analysts of monetary and financial trends in order to summarize the most important trends and experiences from the last five decades. By participating in the process of creating the book on behalf of SUERF during 2012 and 2013, the editors have benefited very much from discussions of the collected insights of the researchers. We hope that the readers will experience similar benefits. If some future decision makers are among the readers of the volume, we may even hope – in the spirit of Spinoza – that knowledge of the past experience may inspire improved policies regarding money and finance and a better macro-economic and micro-economic performance.

Aarhus and Vienna, June 2013

1. Global and European Monetary Arrangements: from Bretton Woods to EMU

Niels Thygesen

Abstract

Very significant changes have occurred in both global and European monetary arrangements – and in their interactions – since SUERF was founded in 1963. Then the European countries were on the whole comfortable participants in the Bretton Woods system, though keen to make the role of the United States less dominant. On three occasions over the last half century, European efforts to build their own monetary arrangements were triggered by global currency instability, but on the two occasions when Europe tried to form an Economic and Monetary Union – 1970 and 1991 – the response went far beyond what a quest for more stable exchange rates could explain; the set-up of the European Monetary System in 1978 was a more defensive reaction. The European experience has analogies to the global one, particularly in the inadequacy of surveillance of national policies, while conditional lending in Europe has become aligned to that of the IMF. At the end of the half-century Europe has, of necessity, become more narrowly focused on regional than on global monetary arrangements which have proved very difficult to modify.

1.1. Introduction

The overall headline for monetary and financial events in Europe over the half-century since 1963 is well captured in the title of the present introductory chapter to the anniversary volume of SUERF. In 1963 the attention of policy-makers in the six member states of the then European Economic Community (EEC) was to a large extent focused on improving the functioning of the global monetary order established at Bretton Woods that had, until then, served well also their interests. They had by 1959 successfully overcome the regional arrangement of the European Payments Union, designed to economize on scarce dollar balances in the early post-war period, and liberalized their current account transactions. Further moderate reform efforts in the global monetary system, notably to diminish reliance on the dollar, might have postponed subsequent European ambitions to create distinct and tight regional monetary arrangements well beyond the 1960s.

However, the global order soon began to erode; a decade later it had virtually disappeared, inspiring several European countries to grope for more stability at

the regional level. By 1970 they had produced a very ambitious outline for an Economic and Monetary Union (EMU) which was too far ahead of its time when dollar instability and energy prices combined to produce an unprecedented shock to the European economies from 1973. After nearly two more decades, marked by some overall progress, but also significant reversals, the now 12 Member States in the European Union signed a Treaty in Maastricht to establish a second version of EMU, with a single currency to come into existence at the latest by 1999. Another two decades later, attention has had to be focused on assuring the survival of EMU in the face of a deep crisis, lasting so far for more than five years.

Crucial to the outcome of those efforts throughout the half-century is the triple challenge, faced by any multilateral monetary system: to design adequate mutual surveillance of national policies with international ramifications, to provide international liquidity, and to be ready to extend conditional lending to countries with limited access to international financial markets. Now as in 1963, the interaction of global and regional dimensions of international monetary arrangements is important, even though the European focus has of necessity shifted nearly completely from the global to the regional dimension.

This chapter will follow a largely chronological pattern. Section 1.2. looks at the first decade from 1963, marked by the gradual demise of Bretton Woods and the early ambitions for EMU. Section 1.3. chronicles the difficult experience that followed, as a fragmented Europe developed even greater internal instability than the global, now much looser system, but also how Europe began to overcome this state, as priorities were gradually clarified and finally embodied into the Maastricht Treaty. Unfortunately this framework proved inadequate after an initial relatively smooth decade: first increasingly divergent performance and policies in a number of member state economies built up major tensions between the member states; then the absence of instruments for crisis management delayed recognition and reactions. But the deficiencies have been under intensive repair since early 2010, drawing in part on the experience with global monetary arrangements; this is the topic of Section 1.4. Tentative conclusions are presented in Section 1.5.

1.2. THE DEMISE OF BRETTON WOODS AND EARLY AMBITIONS FOR EMU

By 1963 the Bretton Woods system was near peak status, though its future was not entirely unquestioned. The system no longer looked quite like the design from 1944, or at least the vision of the main international power, the United States, see Steil (2013); the United States was no longer as dominant in the global economy where Europe and Japan were catching up rapidly, and a US current-account

deficit had emerged. One US concern from Bretton Woods remained: to defend the United States against becoming uncompetitive in a system where the US could not herself devalue her currency. The system's custodian, the International Monetary Fund, was not as firmly in charge of surveillance, including of exchange-rate changes, as planned.

But the initial European disaffection with the global system was motivated more by concern about international liquidity than by the exchange-rate system. Some far-sighted economists, notably Robert Triffin, then at Yale University, had taken up the argument, unsuccessfully advanced by Keynes at Bretton Woods, that an international monetary system based on one national currency would tend to become not just politically contentious, but outright unsustainable. In his 1960 book, *Gold and the dollar crisis*, Triffin had convincingly argued that it would be a rare coincidence for the rate of expansion of international reserves, desirable from a global perspective, to match the supply of assets from the main reserve provider through a deficit on current account; if the supply were to rise more slowly than demand international growth would be adversely affected, but if it were to outpace demand, a confidence crisis would arise sooner or later. More specifically, could the US reserve provider assure convertibility into the ultimate reserve asset of gold at the fixed price of USD 35/ounce – the core of the gold-exchange standard – in the latter circumstances? This "Triffin Dilemma" was about to reach the official agenda in 1963, largely at the instigation of France; President de Gaulle and his advisers, most prominently Jacques Rueff (1971), advocated a revaluation of gold which could have provided at least a temporary relief to the dilemma. But from 1965 global officials and the IMF began to design an alternative response to the dilemma in line with Triffin's analysis, viz. to influence the pace of international reserve creation by issuing a supplementary international asset – initially labelled Composite Reserve Units, later Special Drawing Rights (SDR) – not based on a national currency, but on a basket of internationally usable currencies. Even the US authorities had by 1965 become convinced of the need for reform.

In the course of the 1960s the United States, over a decade-long upswing which started in 1961, moved into a sizeable current-account deficit, not matched by longer-term inflows. Indeed, there were also large US outflows of longer-term funds in several forms: Foreign Direct Investment, portfolio capital or borrowing by European enterprises and public authorities in the large and liquid US securities markets. Hence, the inflow of short-term private funds into US markets, supplemented by the willingness of foreign central banks to accumulate dollars, had to finance both the US current-account deficit and long-term capital exports, the "basic balance". While US policy-makers did not show willingness to modify the widening current-account deficit through domestic policy adjustments – "benign neglect" has been an apt term for characterizing the US attitude to the

current account almost without exception since 1945 – various measures were adopted to dampen US longer-term capital outflows, notably an Interest Equalization Tax of 1963 which made borrowing in US markets more expensive (and boosted an embryonic dollar market in London).

The US authorities encouraged their European counterparts to improve the functioning of European capital markets, hence reducing Europe's reliance on US as a source of funds. Major studies were produced, notably by the OECD (1967). But any prospective improvements in the capacity of European capital markets to channel excess savings into productive investment could at best become observable in the long run; Despres, Kindleberger and Salant (1966) convinced many that the United States had – and was bound to retain for some time – a comparative advantage relative to Europe in transforming short-term flows into longer-term (and more profitable) lending. Adjusting current-account imbalances did not get far, when the OECD's Working Party 3 addressed the underlying problems explicitly for the first time, see OECD (1966); there was no agreement on who should adjust to whom. The issue of symmetry between surplus and deficit countries in the adjustment process was as controversial then as it is today at the global level and within Europe; the only difference is that the Europeans in the 1960s were largely in agreement that rebalancing was primarily a US responsibility as the deficit country, a view currently held by Germany and other surplus countries in Europe.

There were, however, important nuances in the way the Europeans expressed this view. In particular, France adopted a more aggressive stance on the US role than did Germany (and most other European countries). France saw the role of issuer of the dominant international reserve asset as "an exorbitant privilege" for the United States. This perspective is invoked occasionally also in current debates on international monetary reform, but is this suggestive label justified and, if so, in what sense? It is a privilege for a country to be able to borrow substantially in the domestic currency to finance a current-account deficit; it may be an even greater privilege to host internationally very efficient financial intermediaries, able to turn short-term inflows of funds into longer-term more profitable foreign investments, as the experience first of the United Kingdom in the age of sterling dominance and then, in the postwar period, of the United States illustrated. It was arguably the second privilege that especially irked Rueff and others in France, a recipient of major FDI inflow from the US, vividly described in Servan-Schreiber (1967).

Both elements of privilege permit a longer period of domestic demand expansion than would otherwise be possible; gaining time for longer-run adjustment is valuable, but opens up temptations to misuse. But there are also more outright costs to being the main issuer of reserves; Triffin's dilemma focuses attention on the modern theme of a "sudden stop" – the risk of rapid reversals of financial

flows, as the build-up of short-term liabilities outstrips reserve assets, in the US case gold. Easy financing can also imply the accumulation of imbalances and external debt of a size which becomes difficult to correct even at a moderate pace. Some recent authors have gone as far as to talk about an "exorbitant burden" of being issuer of a reserve currency, see Pettis (2013). However, benefits seem to have outweighed costs for the United States; US economists have had a difficult time finding clear examples of US policies over the past several decades significantly modified by external considerations.

France tried hard to bring forward such considerations, first by drawing explicit attention to them – President de Gaulle's press conference in early 1965 was a highlight in these efforts – subsequently by requesting conversion into gold of parts of France's dollar reserves, as they began to accumulate in the mid-1960s; France aimed to hold 90% of international reserves in gold, only the remaining 10% in dollars. Although France was not isolated in taking this action – the Netherlands also converted dollars into gold – it triggered assurances from the German Bundesbank that Germany would not demand such conversions. This difference in attitude reflected general foreign policy considerations, and the bank drew criticism inside the country. Anyway, pressure on the US reserve currency status was mounting, also because the residual European reserve currency, sterling, was approaching the end of its role, following several payments crises and a large devaluation in 1967.

The agenda of European policy-makers focused in this period to a surprisingly large extent – at least from today's perspective – on efforts to coordinate European views on how to deal with major and growing Atlantic imbalances and the associated cracks in the global monetary system. That was the case in the EEC Monetary Committee of Treasury and central bank officials and, from 1964, in the new Committee of Central Bank Governors (CoG) which also began to meet on a monthly basis. The CoG met at the time of the monthly meeting of the Group of Ten (G10) countries at the Bank for International Settlements in Basel, and it seemed quite natural to continue the discussions on the global agenda from the G10. James (2012) documents how the agenda of this new significant body from 1965 was dominated by the systemic issues of the creation of a new reserve asset. Officials from Treasuries and central banks discussed current-account imbalances with their North American and Japanese counterparts at the OECD; the IMF had not yet become a forum for debates on the global monetary system, but confined itself largely to looking at their major members one by one. So the Europeans and their central bankers had – and liked to have – a special role in discussing global systemic issues.

Regional issues, particularly surveillance and conditional lending facilities, first caught the attention of European officials during Italy's balance-of-payments

crisis in 1963-4. In the absence of regional borrowing facilities, the Italian authorities asked for an IMF programme, without prior consultations with their EEC partners. The US authorities were helpful in facilitating swift negotiations between the IMF and Italy, and the current-account crisis was soon overcome, as overheating was corrected by a modest tightening of policy.

The IMF was not better prepared than the Europeans, but seemed more capable of reacting firmly, but generously, to a balance-of-payments crisis, a challenge it has taken Europe nearly half a century to rise to. Europe's capacity to react seemed to have diminished since the early 1950s, when, at the time of the European Payments Union, an adjustment programme for an overheating German economy had been rapidly and successfully implemented as proposed by her partners, but with the United States still looking over their shoulders. The experience of 1963-4 – to be repeated in the mid-1970s – left the impression that the European club of nations was too small, and had too much mutual dependence, to exercise firm surveillance of each other and to extend conditional loans; to perform these tasks it would be more useful to call on the global institution, the IMF, more distant from any borrowing government, and hence capable of greater objectivity.

A few years later, growing tensions between France and Germany forced an adoption of a fuller regional agenda. The weakening of political authority in France and the costly wage negotiations – "les Accords de Grenelle" – through which the government bought off the labour unions to end months of unrest had undermined the residual confidence in a continuation of a decade-long currency stability in the EEC. France resisted a devaluation until August 1969; shortly thereafter Germany revalued, producing a change of nearly 20% in the central rate between the two major currencies. This called for a political response to contain future divergence. The European Commission, through its Vice President Raymond Barre, and new political leaders in Germany and France – Chancellor Brandt and President Pompidou – were ready at the first meeting of Heads of State and Governments – later to be labelled the European Council – in the Hague in late 1969. That meeting accepted a package of two momentous steps: to enlarge membership, notably with the United Kingdom, and to deeper integration by authorizing a study on moving by stages to a full-scale version of EMU in the course of the decade of the 1970s.

Was the main motive for the latter surprising initiative the emerging intra-area disequilibria, or the recognition that exchange-rate and monetary stability could no longer be imported from a benevolent international system, but had to be underpinned by a special regional effort? The answer is not obvious; both inspirations are evident in the Werner Report (1970) which followed up on the Hague Summit guidelines on EMU. The trend towards more flexibility in the

global exchange-rate system, as fluctuation margins for each EEC currency against the dollar were to widen, hence allowing twice the width of the swings between two EEC currencies, did not suit the purposes of a Common Market and a Common Agricultural Policy, based on uniform prices.

In retrospect, the main contribution of the Werner Report may have been to make it very clear that the Europeans did not share the view that they needed within their Continent anything like the exchange-rate flexibility sought, or accepted as a necessity, in the global system. The Bretton Woods system did wait very long to recognize the need for a weaker dollar, which could only come about by the appreciation of non-US currencies. But, once that imbalance had been corrected, the European preference would have been to continue with fixed, though adjustable, rates. And there was no readiness to accept that wider fluctuation margins against the dollar would spill over in margins twice as wide between any two non-dollar currencies. Constraints on exchange rates to at least preserve the past degree of intra-area stability achieved was the least that should be assured. This first EMU initiative, however, went far beyond such modest defensive aims by outlining over three stages towards a federal central banking system, explicitly inspired by the US Federal Reserve System, permanently fixed intra-area exchange rates, removal of controls of capital flows, and a European centre of decision-making for non-monetary policies, all to be achieved within a decade. If fully implemented, the Werner Report would have shifted policy-making in Europe to a distinctly federal framework from that of trying to coordinate national policies.

The Werner Report was a very remarkable document, the ambition of which suggested that internal objectives dominated, though the crumbling of the global monetary system did provide a convenient enabling environment. In one respect, the Report with its comprehensive centralization of economic policies appears, in the light of recent experience with more lopsided integration, logical and appealing, but it was (even) further from the politically feasible then than similar proposals would have been two or four decades later; its confidence in the ability of a European political body to improve the stabilizing features of national budgetary policies was overoptimistic in view of subsequent experience and analysis. EMU was nevertheless solemnly confirmed at a meeting of the European Council in 1972, but movement towards it barely started over the next couple of years. The only elements that survived were the more modest ones linked directly to regional substitutes for the fast eroding international monetary order: an exchange-rate system among some of the EEC member states along the lines of the fading Bretton Woods system – the parity grid of the currencies participating in the exchange-rate arrangement called the "snake" – and a shadowy European Monetary Cooperation Fund (EMCF) to manage, i.e. keep the accounts of, the very short-term credits among the participating central banks, very far short of

enabling the conditional lending possible through IMF facilities. Only the set-up in 2012 of the European Stability Mechanism (ESM) marks a permanent development in Europe in this direction.

The reasons why this first attempt at EMU ended up as a modest and totally inadequate response to the implosion of the global monetary system are not difficult to see. Underlying disagreements within Europe – papered over in the Werner Report – between countries that saw monetary unification as a strategic step in political integration and others who wanted the latter to proceed much further before considering a common central bank and a single currency might have stopped the project even under propitious global circumstances – as they nearly did two decades later. But the main reason for leaving the ambitions behind was the unexpectedly dramatic nature of the collapse of the global order, once again confirming the interaction of global and regional processes.

President Nixon on 15 August 1971 broke the link of the dollar to gold and imposed temporary US "import surcharges" (duties). Initially, the effort – also of the United States – was to save the basic elements of Bretton Woods, viz. the system of fixed exchange rates; IMF and OECD economists did the technical work underlying a package of exchange-rate adjustments, calculated to achieve sustainable current-account positions for the major economies – on the assumption of no major further divergence in macroeconomic policies. This hastily prepared package was endorsed in the Smithsonian Agreement of the Group of Ten in December 1971. Early in the following year, governments pushed ahead by asking the Committee of Twenty (C20), representing all of the then constituencies in the IMF Board, for an outline of a reformed international monetary system. But two global events in 1973 made the effort unrealistic: by March fixed exchange rates for the dollar had to be abandoned, mainly due to more expansionary US policies in the election year of 1972 than foreseen at the Smithsonian, and in October, as the C20 was nearly ready with a carefully drafted document for the IMF meetings in Nairobi, war broke out in the Middle East, followed by the first energy price hike. These events made it impossible to even try to retain the main elements of a reformed Bretton Woods system, and also for the European countries to preserve similar reactions to events.

The United Kingdom and Italy had already left the nascent monetary arrangements before the crisis hit; France followed in January 1974, shortly after the energy shock, leaving only smaller countries around Germany in a rump exchange-rate system. It was not so much that the shocks hitting Europe – a sharp fall in the dollar and higher energy prices – were "asymmetric" between countries; the latter just reacted very differently to these shocks, making exchange-rate stability impossible. Some, notably Germany, interpreted the shocks primarily as a threat to moderate inflation and hence adopted a non-

accommodating monetary stance; others were trying to build a bridge across the temporary shortfall in demand that they saw as the main result of the shocks. The implications of both the massive changes in the global environment and the visible differences in policy preferences had to be acknowledged by the C20 – in which European officials played a prominent part – but also within Europe. When the C20 finally produced its *Outline* for a reform of the international monetary system, Committee of Twenty (1974) it had to be a permissive one, instituting, or permitting, floating exchange rates and with accordingly limited prospects for effective international surveillance of national policies. Not only had the exchange-rate system and prospects for surveillance faded, but the context for monitoring of reserve creation had also been profoundly modified.

The desirability of phasing out sole reliance on a national currency as reserve asset had in principle been agreed when the first allocation of SDRs was made in 1970, but with the arrival of floating further steps in this area seemed less urgent. There was no longer any shortage of international liquidity, if the new energy exporters were to recycle their massive surpluses, as they appeared ready to do. Formally, however, the commitment to the SDR as the "principal reserve asset" and a correspondingly reduced role for currencies and gold remained. Valuable discussions of these issues were left in the Annexes to the Outline; some of them were dusted off by European officials for regional use in the course of the 1970s. A global reform – or rather an "Interim Agreement" – was finally agreed in Jamaica in January 1976, but it provided no path for accommodating a still dominant European ambition for more exchange-rate stability. To find such a framework, the Europeans would from now on definitely have to look inwards to restart their ambitions – towards more solid regional monetary arrangements. They could no longer have any illusions that global monetary reform would advance in a direction which made regionalism superfluous, as had arguably been the case, as long as the Bretton Woods system was functioning well.

1.3. FRUSTRATIONS 1973-93 THE EMS AND THE SECOND PLAN FOR EMU

In the aftermath of the energy price shock and the massive depreciation of the dollar that followed the break-up of fixed exchange rates, the EEC economies were in deep disarray. At no earlier times in post-war history had they been so divergent with respect to the major economic indicators. Average inflation rose to 10% by 1975, and the following year the United Kingdom and Italy both moved into the 20-25% range, and their currencies collapsed. Both countries called in the IMF, again without prior consultations with their European partners.

While changes in exchange rates had become unavoidable in the face of underlying divergences between national performances and policies also within Europe, currency movements had themselves become a trigger for disequlibrium processes no longer just a buffer to accommodate national divergences. It was no coincidence that the model of overshooting exchange rates, presented by Dornbusch (1976), received much attention at this time as an important analytical tool. With a serious worsening in the outlook for an economy and/or an easing of monetary policy, the exchange rate as the only fully flexible price in the system would tend to jump temporarily well beyond what could have been a sustainable new equilibrium level, before beginning to appreciate back towards such a level. But, if wages and prices were becoming faster to adjust upwards to a weakening exchange rate, as seemed to be the case in Italy (which had full indexation of wages) and in the United Kingdom, an inflation-depreciation spiral would be set into motion.

Could one limit currency movements to compensate at most for historically observed differences in national inflation rates? Such defensive thinking had penetrated even the European Commission that had a few years earlier promoted ambitious visions of EMU. If the large countries that had left the "snake" – France, Italy and the United Kingdom – could not realistically reenter a parity grid similar to the one they had been pushed out of, were softer approaches to dampening exchange-rate instability also ruled out, e.g. based on so-called "target zones" for their effective (average) exchange rates? Or, could the intervention rules in a parity grid system be made more symmetric, i.e. more accommodating to weaker currencies? Proposals of the latter type were made on several occasions over 1974-76 by France, and of the former type in 1976 by then Dutch Finance Minister Wim Duisenberg, (Gros and Thygesen (1998)), but they all foundered on the objection that more stability in exchange markets could only come with more serious threats to price stability in the better performing countries than was acceptable to them. If a trade-off between price stability and exchange-rate stability existed, the former would have to be given priority. That had, indeed, been the main German argument against continuing with a fixed exchange rate for the dollar which by the late 1960s had allowed US inflation to be imported into Germany.

Opposition from both the weaker and the stronger economies to taking up another challenge from the Werner Report – to liberalize capital flows and hence subject the EEC economies to competition between national monetary policies – was strong; as the experience with the currency crises in the early 1990s was to demonstrate, this remained a radical approach. Germany, which had liberalized early, did not yet push for others to follow; the difficulties of managing massive capital inflows into Germany in the final stage of the Bretton Woods era were fresh in mind.

Prior to 1977 instability and divergence were more visible in Europe than in the global economy. But that began to change in 1977-78, as inflation decelerated in Italy and in the United Kingdom, France turned to more cautious policies, and dollar depreciation picked up once more. President Carter's Administration was not, despite proclamations to the contrary, averse to a weaker dollar, at least as long as the threat of such weakness actively promoted international policy coordination and, in particular, more expansionary domestic demand policies in Germany and Japan – or, failing that, sharper appreciation of the Deutsche Mark (and of the yen). The terminology of exhorting the two major countries in external surplus to become "locomotives" for the international economy gave way to the more diplomatic notion of "leading a convoy", but the reality remains that Germany at the Bonn Summit in 1978 agreed, in return for US measures to curb energy demand and prices, to embark on a stimulus of German domestic demand, subsequently seen as excessive from a domestic viewpoint. The experience of what global efforts to coordinate implied for Germany helped to make the German political leadership more ready to join France in the concurrent effort to launch the European Monetary System (EMS), comprising eight EEC member states (all but the United Kingdom).

Arguably, the EMS initiative of 1978-9 was the occasion when the global monetary environment most directly inspired both the timing and the nature of European integration. The looming break-up of the Bretton Woods system some years earlier had required a European response, but as argued above the Werner Plan for full-scale EMU went so far beyond a direct reaction that it revealed much deeper regional objectives, however unrealistic they subsequently turned out to have been. The EMS was a more focused and modest approach to preserving and consolidating emerging exchange-rate stability in Europe in the face of a renewed challenge from major swings of the dollar and US pressure on Germany to expand domestic demand or appreciate. The German political leadership, though not the Bundesbank or the financial sector more generally, did accept the case for linking the Deutsche Mark more firmly to those of large, but weaker, European partners, hence sharing the management of external monetary relations at the European level. However, in two important respects, the EMS did not live up to the intentions of its founders.

First, exchange-rate management was to be "as strict as the snake"; that was not a very demanding standard, since there had been regular realignments of central rates since 1973. However, over the initial years between 1979 and 1983 realignments became even more frequent – and cumulatively larger than they had been over any comparable period in the snake. The EMS appeared to succeed relative to the original Bretton Woods system, in the sense that realignments were, indeed, decided in common, not just implemented unilaterally. But the success was mostly apparent, since the decisions taken over a series of realignment weekend meetings

mainly ratified past differentials in national inflation, and much less clearly an ambition to bring about domestic policy adjustments that would reduce future divergence and hence the need for realignments over a longer horizon.

One virtue of a fixed-but-adjustable exchange-rate system is that it provides opportunities for influencing adjustments in the country asking for a devaluation. There was not much evidence of effective surveillance of this type in the early EMS. A relatively permissive approach became necessary when economic policies in Germany and France once more began to diverge strongly during the first two years of the Mitterrand Presidency in France (1981-83). A tightening of procedures became observable from 1982 for some smaller EMS countries in the shape of smaller devaluations than they had asked for, and, with a third large French devaluation of 1983, for France herself. But the lack of firmness of the EMS in its early years meant both that convergence was slow and that it took longer to bring about any sharing of the European role in the global system, still performed by Germany.

Second, the idea to develop the EMS into a European Monetary Fund (EMF) after a two-year period was quietly shelved already in the course of 1980. This second stage was to have added some of the functions of a regional IMF, by extending the management of short-term support among the central banks to longer-term credits of the conditional nature given by the IMF to countries in balance-of-payments difficulties. But there were strong internal and external objections to the EMF. As had been the case with the EMCF from which it started, the EMS founders had disregarded the need to have a separate political institution to handle conditional lending to governments; the central bank officials who were to oversee the implementation of the EMS and its evolution into an EMF insisted that they should not be involved in the essentially political task of passing judgement on national economic policies. They succeeded throughout the first decade of the EMS in keeping the automatic mutual credits arising out of interventions so short – about three months – that countries would not be tempted to delay the more basic policy adjustments that could stop the need for intervening. The automatic very short-term credits were designed to ease liquidity problems for the participating national central banks, just like mutual swap facilities in the global system, not to facilitate more basic adjustments.

There was also opposition from the IMF and from its main shareholder, the United States, to the EMF; international conditional lending should, they argued, be extended according to global principles, rather than within a regional club which could be suspected of softening standards, see Polak (1980), (1997) and Thygesen (1997). A similar reaction from the IMF and the US was observed 20 years later when Japan, in the aftermath of the Asian crisis, proposed an Asian Monetary Fund to assume important responsibilities in intraregional lending in

Asia. There is a strong and understandable interest in the global community to preserve global standards in conditional lending, an attitude to which both Europe and Asia have since accommodated by linking the terms of their respective regional lending programmes to those of the IMF, though there is as yet no experience in Asia as to how this type of linkage would work in practice.

To summarize, the two weaknesses of the EMS relative to intentions – an initially permissive exchange-rate mechanism and an inability to develop instruments for longer-term adjustment of imbalances – implied that Europe did not quite rise to the challenges posed by renewed global instability in the late 1970s. Germany was not as firmly embedded into the regional system as to be relieved of the burden of being in the front line in international policy coordination, nor did Europe succeed in designing conditional lending of a type that would make reliance on the IMF superfluous. But in the course of the 1980s two additional powerful impulses came from across the Atlantic to encourage Europe to take bolder regional policy initiatives and to remedy the observed weaknesses of the EMS.

The first was the familiar one of continuing, but by the mid-1980s unprecedented, dollar instability. For more than four years from early 1981 the dollar appreciated strongly against the European currencies, primarily as a result of expansionary US fiscal policies and, at least initially, tight monetary policies as inflation was reduced. This faced the EMS countries with an acute dilemma: should they accept higher inflation by allowing their currencies to depreciate, or should they raise interest rates to defend the external value of their currencies, hence dampening growth below already modest levels? The tensions also affected the EMS national currencies differently, illustrated when a correction of the major overvaluation of the dollar gained additional momentum from September 1985 through the so-called Plaza Agreement. This was a belated recognition by the Reagan Administration, 12 years after the break-down of Bretton Woods, that exchange markets would not stabilize simply as a result of each major country "putting its own house in order", as had been the US hope over the first half of the 1980s; more focused and coordinated policies had to be put in place. These policies worked well for a year and a half as the dollar dropped to a sustainable level, and they were then replaced by the stabilization of the main currency relationships, embodied in the Louvre Accord of February 1987.

Both the rise and the fall of the dollar, but particularly the efforts of the Accord to stabilize the dollar against the EMS currencies, revealed the continuing weaknesses of the system, as long as the Deutsche Mark was effectively the pivot; this was illustrated in the fall of 1987 when Germany angered the US authorities and, to a lesser extent, the other EMS participants by raising interest rates. Even when national economic performances in Europe had converged substantially, residual policy differences would attract the attention of currency markets and make the

EMS unstable, particularly as long as the global system showed instability; this provided an incentive to take the EMS further.

The second impulse to further European integration came from the observation that the US economy had been growing much faster than the aggregate of the European ones since coming out of the recession of 1981-82. There was a need for Europe to create a more competitive and deeply integrated Single Internal Market for goods and services in Europe. Detailed plans were agreed in 1985, including use of Qualified Majority Voting in their implementation – a reform supported by all Member States, even the United Kingdom. There would have been no firm determination to take this programme seriously without reducing the risk that competitive positions in the integrated market could be undermined by sizeable shifts in relative prices due to the currency realignments which remained possible in the EMS. Monetary integration had to catch up with the real integration underway, particularly as the latter implied also a timetable for removing controls with capital movements which was bound to make the EMS more unstable. Policy officials were well aware of Mundell's trilemma, viz. that a country cannot aspire at the same time to achieve the three objectives of a stable exchange rate, free capital flows and autonomy for national monetary policy; one would have to go – and with EMU it would be the third objective in what Padoa-Schioppa (1994) labeled "the inconsistent trinity" (or quartet, if one also takes into account the objective of sustaining free trade and avoiding protectionism).

The perception that a single market, extending also to financial services, would work far better with a single currency than without one was the main economic inspiration for launching EMU. As in 1970 internal objectives were more important than defending Europe against global currency instability, though the latter was even more readily observable in the late 1980s than a decade earlier when the EMS was set up. As also discussed in Chapter 6, with the Maastricht Treaty, Europe by 1992 went much further than any defense against global instability required. A single currency broke with the perception, still guiding the global system, that the issue of money is a distinctive prerogative of a national state; and this time the break was clearer than in the Werner Report where "irrevocably fixed" exchange rates were still discussed as an option for the final stage.

The vision for EMU was, however, less ambitious in its design for implementation than two decades earlier: there was to be centralization of monetary policy, but other economic policies would remain in national hands, though subject to upper limits on public sector budget deficits and longer-term norms for public debt. In contrast, the Werner Report had advocated central decision-making at the European level, also for the budgets of Member States. Many have been very critical of the narrower version of EMU, claiming it was dictated by political convenience rather than economic analysis. Such criticism overlooks that the

emphasis in the Maastricht Treaty was not on improving national stabilization policies through joint European decisions, but on upgrading longer-run sustainability of public finances as a policy objective in the Member States. In 1970 the average ratio of public debt to national income was about 30%; two decades later it was close to 70% and rising. Higher priority had to be given to the long-term perspective for national budgets; that could be achieved better by clear rules than by joint and discretionary management of the budgetary stance, provided there is both a sense of national responsibility towards the rules on ceilings and a willingness on the part of partners to monitor compliance. A contributing factor to the major change of emphasis since 1970 was that there was less confidence around 1990 that budgetary policies could – or would in practice – be designed so as to contribute to short-term stabilization; both the difficulty of getting the timing right and political considerations would often prevent that. As the Treaty was being negotiated, pro-cyclical national budget policies were observable in several European countries; governments found irresistible the temptation to stimulate domestic demand when they felt able to afford it rather than to react countercylically.

Political initiatives try to respond to recently experienced challenges. At Maastricht the main challenge was to make the European economies more robust to the spill-overs of national monetary developments and policies across borders which could threaten the Single Market. Spill-overs from other national economic policies, macroeconomic or structural, are likely to be largely contained within national borders; hence authority to decide on them could remain in national hands in accordance with the principle of subsidiarity. This was, in retrospect, too optimistic a view – as was the omission of macroeconomic imbalances other than those observable in public budgets. In the EMS participating central banks and government regularly monitored developments in indicators of external imbalance – current account positions and relative price trends – as the guidance from these indicators to the size of and follow-up to realignments depended on them. In EMU, this monitoring stopped.

In my Marjolin Lecture to the SUERF Frankfurt Colloquium in 1998, a few months before the formal starting date of EMU, I argued that it was possible to trace five major ambitions of European monetary integration that had evolved over the long history since the 1960s. They were (Thygesen (2000)):

– reducing, then eliminating nominal exchange-rate fluctuations;
– reducing, then eliminating inflation;
– developing rules for non-monetary national policies, then scope for coordinating them without undermining the rules;
– developing a potential role in the international monetary system, then adjusting it to the realities of today; and
– developing a European profile in financial regulation.

This is still a useful summary list, but my assessment of 15 years ago that three, may be only two and a half, of these ambitions had been met in the Maastricht design was too positive. In addition, one ambition – effective crisis management – was missing, because it was regarded as superfluous. By 1998 the need for it had not yet emerged.

By definition, the introduction of a single currency eliminates all fluctuations between the national currencies that have merged into the new supranational unit. Hence, this first ambition can be dealt with briefly; but the arguments why it is important need to be kept in mind also today. They go back to what most Europeans regarded as costly and excessive fluctuations in exchange rates, not so much in the short term as over longer disruptive cycles, since the breakdown of the global fixed-rate system in the early 1970s. EMU is at its core an expression of the continuing stronger preference of European policy-makers for fixed exchange rates inside their region than is found in other regions of the world economy.

The challenge for the founders of EMU was to assure that eliminating national currencies in Europe would not lead to a downgrade of the objective of price stability. The Bretton Woods system – which did have a formal anchor through the link of the dollar to gold – had left the perception that fixed exchange rates were likely to be incompatible with low and stable inflation over longer periods. The lengthy preparations in the EMS for Maastricht did persuade the countries that had been skeptical, notably Germany, that there was not necessarily a trade-off between internal and external stability. The starting point looked auspicious: France, in particular, had seen her inflation rate converge substantially towards German levels, before EMU was negotiated; Italy was making good, though slower progress. Optimism that this process was likely to be reinforced was based on expectations that intensified competition in the Single Market would keep national cost and price trends broadly parallel, and that economic policies based on the fiscal rules would support such tendencies. The participants in EMU would by sharing a single currency come closer to meeting the criteria for being an Optimum Currency Area. Such optimism, not totally unwarranted at the time, formed the premise for the Franco-German compromise on EMU: for a well-behaved France (and others) a deserved share in the leadership of Europe's monetary affairs, so far solely in German hands, in return for Germany's prospect of exporting the "stability culture" on which past German EMS leadership had been based. This compromise extended to reliance on both objective criteria of economic performance for admission to EMU and a firm timetable for starting the final stage with whatever number of countries proved to be ready by 1999, at the latest.

These two main achievements still stand, but the third – achieving coordination of national economic policies outside the monetary area through a simple rule

book for national policies, particularly in the fiscal area – can not be said to have been even half-implemented. The ceilings on national budget deficits and the norms for public debt ratios of the Stability and Growth Pact (SGP) fell into disuse and have had to be subjected to intensive repair work in the recent period, see Section 1.4. below, and the balance between a rules-based system and more discretionary decisions which continues to be tilted towards the former in line with the original ideas behind the Maastricht Treaty is being questioned anew.

As regards an exchange-rate strategy for the euro, few at the time of Maastricht believed that much ambition needed to be put into this area. Disagreements within EMU on the tolerable range of fluctuations for the euro against other main currencies have persisted until today, but the provisions of the Treaty, quite deliberately, make it very complex for the two Euro area authorities concerned – the Eurogroup and the ECB – to agree on interventions in exchange markets; despite large swings in the external value of the euro, the Eurogroup has never been able to agree within its own ranks and, a fortiori with the ECB, on even the vague "general orientations" for exchange-rate policy foreseen in the Treaty.

The role of the exchange rate vis-à-vis the dollar and other global currencies is an illustration that most Euro area policy-makers tend to view the problems of the euro primarily as an internal matter, much less as part of a global agenda. But some have disagreed all along; at the stage of planning for EMU, a minority of national officials believed that some pooling of international reserves and interventions in third currencies according to a jointly formulated strategy would provide an important starting point for an internationally responsive EMU, as well as a useful training experience during the transition to the final stage, see de Larosière (1989). But such emphasis on the exchange rate was not acceptable to Germany and to other national officials who saw no need for sharing any form of monetary sovereignty until the third and final stage of EMU and who anyway placed less emphasis on the role of the exchange rate in policy decisions than France did. As the competitive positions of the participants have diverged in EMU, disagreements on what is an appropriate level for the external value of the euro have widened, making a reversal of the hands-off attitude to the exchange rate ever less likely. The Eurogroup has yet to agree on the formulation of some "general orientations" for the external value of the euro, and remains likely to be unable to do so.

As regards financial regulation and supervision, a European dimension is now finally developing, with a major role for the ECB first in macroprudential supervision and, more recently, even as a supervisor of banks. Neither officials, nor most academic economists had foreseen any need for such developments 20-25 years ago, when financial crises had not been observed on any systemic scale for decades, and banking remained a largely national industry in Europe.

Governments would not have been ready to contemplate any transfer of national sovereignty over their financial institutions and markets, a more sensitive area from a political point of view than monetary policy. National regulators who at the time saw their authority being widened and merged within national borders into powerful unified Financial Services Authorities resisted incursions onto their turf. Central banks were not anxious to ask for supervisory functions which they regarded as tedious, unnecessary for their monetary mandate, and potentially dangerous to their autonomy in monetary policy vis-à-vis both the political authorities and the financial institutions. Almost by accident, the Maastricht Treaty left in a vaguely formulated sentence that has recently provided the tenuous legal basis for giving the ECB "specific tasks related to prudential supervision" beyond an advisory role (now Art. 127.6 of the Lisbon Treaty).

Leaving the general macroeconomic underpinnings of a single currency relatively weak, avoiding any collective or joint responsibility in EMU for national government finances and particularly a lender-of-last resort function to governments for the ECB, making ECB intervention in the exchange market complicated and unlikely, and limiting the bank's role in financial rescues can all be seen as illustrations of the core ambition at Maastricht: to enable a particularly purist version of a central bank to emerge. The coming ECB was not to be distracted from its central mandate – to assure price stability in the medium term – by the tasks of lending to public authorities, buying other currencies or providing liquidity on a major scale during periods of financial instability. On this strategy there was wide agreement among the signatories at Maastricht. Nor was there much criticism from academic economists – though Folkerts-Landau and Garber (1992), pointedly asked whether Europe was setting up a central bank or just instituting a monetary rule.

From today's perspective there should have been a sixth ambition – to design a crisis mechanism for the situations when, despite all good intentions and rules, a country falls into severe difficulties and loses access to international financial markets. The global system has long had such mechanisms in the form of IMF conditional lending to members in balance-of-payments difficulties, and these mechanisms have since about 2000 been extended and refined on several occasions, and more recently supplemented by short-term lending, targeted at countries in liquidity difficulties, but not requiring major adjustment (the Flexible Credit Line and the Precautionary Credit Line). EMU was not seen at Maastricht to need such facilities. There were elaborate and, hopefully, binding constraints on national behavior, both in the form of the rules for budgetary policies and, ultimately, of the so-called "no-bail-out" rule, preventing other EMU countries from assuming the debt obligations of a country in financial difficulties. The whole framework was seen as providing strong incentives for each participant, positive as well as negative, to maintain access to international financial markets.

Anyway, external imbalances should be financeable more automatically for countries in a single currency area than globally. New mechanisms were only put in place when the financial and economic crisis had demonstrated a definitive need by 2010.

As the EMU preparations ended at Maastricht, many observers doubted whether the transition to the final stage of EMU could be made; to make the prospect less uncertain, a firm target date of 1999 was put in, regardless of the number of countries ready at the time to adopt the single currency. The final stage had been outlined in sufficient and reassuring detail, but the provisions for the transition through the initial two stages were vague. The first stage looked very much like the past; while the second stage did establish a new institution, the European Monetary Institute, that was only to prepare for full EMU, not to rehearse the exercise of common powers. However, doubts proved unfounded; the final stage looked sufficiently attractive for a surprisingly large number of countries to make an important effort to be in the first group. By advancing the convergence in interest rates that would take place from the start of a credible EMU, the budgetary efforts required to meet the Maastricht admissions criteria became less onerous. Despite the set-back of first the loss of some participants in 1992, then the relaxation of the EMS as a result of the crises in 1993, it proved possible for no less than 11 Member States to meet the criteria on the basis of their economic performance in 1997, only four years after the EMS stepping stone to EMU wobbled.

There were two major reasons for the speed with which a wide EMU could start: (1) Some of the supposedly weaker EMS participants, notably France, retained their central rates, resisting the calls from the IMF and other outside observers to use their greater room for maneuver within the wider fluctuation margins in the EMS, and (2) the German economy remained weak during this period (and in the initial years of EMU). At Maastricht other countries were fearful of the added strength of the German economy after unification which would raise its population by nearly one third. This proved to be unjustified; for nearly 15 years after the fall of the Berlin Wall the performance of Germany was impeded by the heavy budgetary burdens of unification with massive fiscal transfers to the East and by weaker competitiveness imposed by too much construction activity at home and by devaluations by some future EMU partners. These two factors too gave the process of the build-up to EMU an image of greater cohesion and success in the transition than expected.

In retrospect, the period 1994-98 was promising both for the European efforts to prepare entry into EMU and for the global monetary system. The US economy was growing faster and the apparently intractable budget deficit was fading fast. There were early warnings of international financial instability in Mexico and

East Asia, both facing "sudden stops" of capital inflows, requiring sharp macroeconomic adjustments through IMF conditional lending. But the lesson that financial market discipline could be brutal was regarded as irrelevant in EMU where the main past transmission channel of tensions through exchange markets had been effectively removed. Criticism of an "incomplete" union abated within Europe as well as globally, allowing EMU to start as planned – on a note of self-congratulation. The Asian crisis of 1997-98 did not cause much soul-searching in Europe; the perception was that some of the countries had conducted policies that were more unsustainable than could occur in Europe. Furthermore, Europe did not have the currency mismatch problems of the Asian countries who relied on borrowing in foreign currencies. The European complacency turned out to have been misplaced on both counts; external imbalances would build up to far higher levels than in Asia, and no single EMU participant could safely regard the euro as their national currency at times of crisis, raising questions about solvency similar to those in Asia.

At the time when EMU started, the prevailing view on the choice of exchange-rate regime among both officials and academics was that it was basically a binary choice between fully flexible rates or a common currency. Intermediate forms, ranging from regular management through interventions, through target zones to more closely administered systems such as the EMS or even currency boards were likely to be inferior to either extreme regime. This conclusion seemed to be borne out by both the EMS crises in 1992-93 and the subsequent events in Asia and Latin America. Yet, some experiences with a system of tightly managed, but still in principle adjustable exchange rates, have been successful, even with high capital mobility, as long as the participants were able to maintain a high degree of credibility for their policies. Some countries had a positive experience in the EMS, and a similar regime, labeled Exchange Rate Mechanism II, was retained for countries preparing to enter the euro. The only country to retain participation in ERM II over a long period is Denmark, though not a candidate to join the euro in the nearer future. Euro candidates have typically regarded ERM II as a waiting room where it was unsafe, for the reasons mentioned above, to remain for more than the minimum two-year period prescribed. But the capacity of good domestic policies by themselves to make a fixed exchange rate sustainable should not be overlooked to the degree experienced in the run-up to EMU.

1.4. REPAIRING SURVEILLANCE TO SAVE EMU – BUT NO GLOBAL ROLE FOR EUROPE

There were two challenges in the early years after the start of EMU: the single currency weakened surprisingly vis-à-vis the dollar and other major currencies

over the first two years, and the fiscal rules came under strain. The first was also a global issue, the second purely a regional one.

The "challenge" of a weaker euro was temporary, largely explicable in terms of fundamentals, and not unwelcome in several EMU countries, including Germany, which still had competitiveness problems and a current-account deficit. The challenge led to the single occasion in 2000 when the ECB intervened in exchange markets, in part together with other central banks. When the Fed lowered its policy rate to 1% and kept it there for an extended period in 2003-4, the euro appreciated; by 2004 it had risen above its initial level which was widely considered to be close to a longer-term equilibrium.

The strain on the fiscal rules had more serious consequences by revealing weakness in the surveillance process. Ireland and Portugal had received recommendations in 2001 to conduct more prudent, in the Irish case, less pro-cyclical budgetary policies. When the Commission addressed similar recommendations to Germany and France in 2003, the Eurogroup – Finance Ministers of EMU participants – did not support this step; for a year and a half the SGP was suspended. France and Germany supported each other and were backed by the two countries with the highest debt ratios, Belgium and Italy. The two largest countries did not even bother to argue in detail for an extension of the adjustment period, as Germany could have done with reference to the longer-term structural reforms on which the Schroder government had embarked and which would contribute to the sustainability of public finances.

By May 2005 a revised SGP was agreed. The Pact was now more a framework for negotiation than a firm ceiling (or norm) from which Member States could be expected to keep a respectful distance. This was a relaxation of the central element in EMU surveillance which had initially attracted positive attention globally. Yet the revised Pact might have worked, if participants had been less inclined to be polite to each other. Still the next 2-3 years did not reveal additional budgetary imbalances; an economic upturn made it gradually easier to keep the deficit under 3% of GDP. But the analytical methods for evaluating the underlying or structural deficits were only being developed in this phase, and monitoring efforts remained inadequate and sometimes undermined by national misreporting.

A particularly gross example of the latter was brought to light after the Greek elections of October 2009. Until then financial markets also had failed to do their homework, since spreads between 10-year sovereign bond rates, even in the case of Greece, had stayed in the 20-30 basis points range, representing a surprising underpricing of risk, due to a belief that the no-bail-out provision would not in the end prevent rescue by a country's EMU partners, or to an underestimation of the imbalances. Governments and the ECB tended to take the remarkable

convergence of interest rates as a compliment to the cohesiveness and success of EMU, rather than as a conundrum. Other international institutions performing regular surveillance such as the IMF and the OECD did not identify the severity of the Greek crisis either.

Greece was a unique case both because of the size of her budgetary and external imbalances and the suddenness of the revelations, but not the only country where EMU surveillance should have raised the alarm. Portugal also had serious imbalances in both dimensions. Spain and Ireland had apparently sound public finances, but in both cases largely due to an exceptional credit-financed boom in their construction sectors and to consumption. The overheating of these economies caused additional inflation, loss of competitiveness and growing external deficits. Constructive surveillance would have identified these two countries as pursuing unsustainable policies, where the large capital inflows financing the current account deficits were not used to build productive capacity to redress the imbalance. But the EMU institutions were focusing excessively on public finances, rather than on the overall macroeconomic balance. This perspective has now been built into the revised procedures in EMU surveillance by restoring indicators of external imbalance – developments in the current account and in competitiveness.

Major repair work on the policy rules and on the effectiveness of surveillance has been performed by the Commission and the Council of Ministers, often under the prodding of the European Parliament and the ECB[1]. In late 2010 a major legislative package - the "six pack" in EMU jargon – tightened the SGP procedures while shifting the focus from actual to the economically more meaningful underlying (or structural) deficits, expanding the perspective from purely public sector to broader macroeconomic imbalances, and making it almost impossible to vote down the Commission's recommendations for adjustments and ultimately sanctions, as had happened in 2003. In 2012 agreement was reached on the introduction of the revised budgetary rules into national legislation – "the fiscal compact" – and the rules will be monitored in each Member State by fiscal councils, independent of the national government, and not only by the Commission. In 2013, the final improvements in surveillance of national policies fell into place when the European Council and the Parliament reached agreement to advance the calendar for examining national budgets to a more meaningful early date and by introducing enhanced surveillance relative to SGP procedures for countries in financial difficulties, the "two pack".

These improvements in international surveillance, in the view of most observers, have gone far enough to seem adequate for normal times; had they been operative

[1] Reviewed in greater detail in Chapter 12 of this book by Ayuso and Blanco.

from the start of EMU, most elements in the crisis might have been avoided. Participants in a monetary union have a stronger need for mutual surveillance than individual countries in the international economy, but the recent improvements have brought the EMU procedures back into the front line of global surveillance practice. In doing so, the Europeans have found it necessary to draw on the stronger analytical work on structural imbalances and public debt sustainability done by the IMF and other global institutions. If the reformed system, when fully implemented, does not work, it is difficult to see how any surveillance can work.

The tighter surveillance now being implemented is primarily designed to reinforce the instruments to make future crises more unlikely. An even more urgent effort has had to be undertaken to bring EMU to a more normal state than the deep crisis of the last few years. The agenda of the EMU institutions has been focused both on preventive measures and on crisis management, and the latter has brought the IMF as guardian of the global monetary system more directly into Europe than foreseen over the past half-century of attempts to develop regional surveillance.

The Greek crisis forced the EMU institutions to strike a balance between the regional and the global dimension in designing support to a country which had lost access to international financial markets. Greece is a member of the IMF, entitled to address herself directly to the global institution to seek financial assistance. The EMU participants, the Commission and the ECB hesitated to call on the IMF for a couple of months, weighing the usefulness of global involvement to dispel the long-standing perception that lending was more lenient in Europe than elsewhere against the loss of European pride in not being able to handle the problems within a regional framework. A formula was found, applied also in the subsequent cases of Ireland, Portugal and Cyprus: the IMF would participate in formulating the conditionality, adding analytical capacity, not least in evaluating the sustainability of public debt, and professional experience in negotiating conditional lending programmes to that of the two EMU participants in a "troika" – of the IMF, the Commission and the ECB. The IMF would contribute half of the amount provided through European institutions.

Cooperation appears to have been useful, but whether it will continue, at least with partial IMF financing, remains uncertain. A recent study, Pisani-Ferry *et al.* (2013), argues that IMF participation in the troika may now largely have outlived its usefulness. The IMF's non-European membership finds that an excessive part of resources are being channeled to Europe which prides herself in being in approximate overall external balance or small surplus; hence the Europeans should be capable of financing intra-area imbalances on their own. Given the way that conditionality has been applied in EMU, concerns that figured prominently

at the start of the EMS with the plans for an EMF have faded both at the IMF and in Europe. It is difficult to claim that lending to EMU countries has been extended on more lenient terms that in IMF practice generally; the notion that such lending continued to be labeled "bail-outs" of debtor countries at low cost to them must have been put to rest since 2010. Continued input from the IMF on the analytical side may be welcome both for its analytical quality and its greater distance from outright political considerations, but it is hardly essential. It is interesting to note that 13 Asian countries cooperating in an extended network of swap facilities, have reached a similar conclusion on the balance between global and regional lending by agreeing to link the conditionality applied in their framework to that of the IMF, see Henning (2011), despite stronger misgivings than in Europe, dating from the Asian crisis, about involving the IMF in regional surveillance and lending, but this model has not yet been tested in Asia.

EMU also appears finally to have found a solution to the problem of defining a division of work between the monetary and the political authorities in crisis management. That problem could not be resolved in the 1970s since the established short-term credit mechanism between central banks could not just be extended in maturity without conditionality and the setting up of a new political institution. On a more permanent basis that has only happened in 2012 with the European Stability Mechanism (ESM), the present version of the EMF of 1978; the ESM is separate from the ECB and managed by a board of political decision-makers.

The delay in setting up the ESM, and its limited size relative to the potentially massive demands on its resources, explains why increasing doubts in 2011-12 as to the capacity of Spain and Italy to preserve access to financial markets created great pressure on the ECB, still the only fully operational EMU institution, to step in to buy sovereign bonds issued by these two countries, to improve the sustainability of their debt. The ECB could hardly do that in view of the firm wording of the Treaty on buying public debt, but a compromise was found, when the ECB announced in September 2012 a programme of Outright Monetary Transactions (OMT), contingent on the issuing country having obtained a conditional loan from the ESM. At the time of writing this innovative initiative has not been tested, but the impact of announcing it did lower the spreads of Spanish and Italian bonds over the German benchmark by approximately 200 basis points.

The sustainability of a country's debt depends on three factors: the initial level of debt, the average interest rate paid on the debt, and the growth rate of the economy. In view of the risk of fostering additional financial instability and contagion through rescheduling of "excessive" debt to private and public creditors, the first of these possibilities, often used in traditional IMF programmes, has been approached with great hesitation in EMU and so far only for the private creditors of Greece. The growth rate of the economy is low, or even negative, in countries

in adjustment programmes – and particularly so in EMU where the initial imbalances were extremely serious. On this background it is an acute problem in making the debt manageable to avoid interest rates that are much higher than justified by fundamentals; if markets push them higher in a mood of pessimism about not only the country's own performance, but also the survival of its participation in EMU – "dissolution risk" – lending programmes with subsidized interest rates – relative to excessively negative views in markets – and supplemented by ECB purchases of sovereign short-term debt under the OMT programme become justified.

The intensive repairs of the surveillance framework, the set up of the ESM and the OMT option have all been implemented without more than a very minimal addition to the Treaty (for the ESM) which did not require ratification by referendum in any Member State, and hence relatively speedily. But these steps, radical and unanticipated as they are, have not exhausted the agenda. Over 2012-13 a banking union with elements of joint fiscal responsibility for bank resolution and deposit insurance were added, and joint issues of parts of national sovereign debt in return for stronger EMU authority over national budgetary policies have moved closer to the agenda. At least the latter package is likely to involve changes in the Treaty and hence a relatively long time horizon; whether they can be implemented at all, is uncertain. If they are, steps will have been taken which make the future EMU more like a national federation than a regional cooperative agreement relying primarily on national responsibility in most policy areas.

The Maastricht Treaty assumed that a single currency would not require centralization of authority for economic policies outside the monetary area, and, as argued above, with the more elaborate preventive surveillance now in place for sustainable national economic policies, this assumption may well be correct in normal times. The dividing line in the European debate is whether it will be possible to get back to "normal times" without putting in place permanently a stronger, more federalist framework, or whether ad hoc measures to end the crisis, notably involving steps of solidarity beyond any Treaty for the transition to normality, could be sufficient – and more acceptable in electoral terms. Those who continue to doubt whether even reinforced surveillance can work will advocate the former.

There are analogies to the experience in the global monetary system. There, too, there is a sharp distinction between surveillance of a country in the preventive, advisory sense and lending on conditions to a country. The former has often been either neglected by the addressee, particularly by larger countries, or watered down in its final version. Despite being more precise and prescriptive than surveillance by global institutions, the SGP was not taken very seriously prior to the crisis from 2008-9. On the other hand, when an IMF programme is sealed by a Letter of Intent from a country, or when the troika settles a programme with an

EMU participant, the additional clout that comes with making external funding available assures that a major effort is made to live up to the agreements. Both types of programmes have fostered resentment in the borrowing country, as decisions taken by international bodies begin to impinge directly on the details of national economic policy with respect to taxation, public expenditures and structural reforms, rather than just on more aggregate indicators, such as the budget deficit. This was the legacy of IMF lending in Latin America and Asia in the 1980s and 1990s which has not quite been overcome; it is currently an outcome of conditional lending to EMU countries. Several "peripheral" EMU countries experience public anger over policy adjustments requested by the European institutions (and the IMF), and ultimately by the creditor countries.

At the global level the IMF may find it easier to overcome this legacy than will be possible at the regional level; policy prescriptions have less of an air of technocratic objectivity in EMU, where national politicians regularly comment on the policies in partner countries. After the Asian crisis several countries in the region decided to follow sufficiently prudent policies that they would not again risk to have to seek IMF programmes. That is not a very efficient solution, but less disharmonious than simple rejection of the interference by partners in a more tightly knit regional grouping. It is particularly important in EMU to get back to a more normal state of affairs where conditionality is less detailed, leaving more room for national responsibility.

During the recent internal crisis and the associated intra-area conflicts the EMU countries have not been particularly active in contributing to the debate on reforming the global monetary arrangements. There was one exception: France, during her simultaneous chairmanship of the European Union and of the G20 in 2011, did try hard to find allies beyond EMU – in China and elsewhere – for a push towards a reformed, multipolar monetary system, as described in Angeloni *et al.* (2011). Not without bitter irony, the Cannes G20 meeting in November 2011 which should have marked a major advance towards this objective was overshadowed by political crises in Greece and Italy. The focus inwards on Europe may have been the best use of time, since the prospects for making any progress in international policy coordination, currency instability and management of international reserve creation have not been propitious. The EMU countries have still taken no steps towards a unified representation in global fora – another indication that external ambitions are not so strong in Europe.

The experiences with the euro as an international reserve currency have also been sobering. The share of the euro in official reserves is only marginally higher than the 22 % recorded for the German mark just prior to the formation of monetary union, and that of the US dollar is nearly unchanged. This fact and the still fragmented nature of representation of the Euro area do not provide the

underpinnings for advancing the long-standing European view that the international monetary system should be based on more than one national currency. There remains intellectual support for such reforms in Europe, see notably the cogent arguments advanced by Padoa-Schioppa (2010) in favour of an updated version of the Keynes plan at Bretton Woods for a non-national reserve asset and a symmetrical adjustment process. There is some recognition by US international economists of the weakness of the dollar standard, as in McKinnon (2013). But there is no prospect of these themes moving on to the official agenda over the next decade or so in the way they did towards the end of the Bretton Woods era, even if European views may find sympathy among potential new issuers of international reserve currencies such as China. Europe will be under little pressure not to focus on the internal agenda.

1.5. CONCLUSIONS

Early postwar global monetary arrangements were in broad conformity with the preferences in Europe for a high degree of exchange-rate stability and rapid growth in international liquidity. The European governments and central banks were to a large degree engaged in efforts to improve the global system, in particular by putting reserve creation on a more diversified basis than through the US balance of payments. While the central role of the United States had been readily accepted in the early post-war period as constructive and necessary, Europeans began to question both the stability and the equity of an international monetary system based only on the dollar. But from the late 1960s they turned their attention increasingly to internal matters with the first plan for EMU and, when that foundered, to differentiated responses to global disorder. The plans for EMS are particularly interesting as the main example of inspiration from the global system; this initiative extended exchange-rate stability in Europe, but also moved towards a European Monetary Fund (EMF) – a regional IMF.

As convergence among the European economies improved in the 1980s, while global currency markets saw wider swings than ever before, the ambition to launch a single currency as a complement to the Single Market grew into the Maastricht Treaty. Given the increasing instability of the EMS in 1992-93, opinion firmed that the only safe way to exchange-rate stability was to forge a common currency. To the surprise of most observers EMU actually started in 1999 with no less than 11 participants. Though successful in meeting its narrower monetary objectives, weaknesses of surveillance of non-monetary policies – a lack of political backing and inadequate analytical foundations – made EMU highly vulnerable when the international financial crisis struck from 2007 onwards.

Intensive repair work since early 2010 has greatly improved the capacity of EMU surveillance to prevent future crises, while crisis management has been bolstered by the set up of a safety net, the ESM, filling the gap that was left by the failure to build an EMF earlier; conditional lending has become possible at the regional level, and has been coordinated with the IMF global experience in managing programmes with borrowing countries. There are also efforts under way to set up facilities for countries not (yet) in programmes, but facing punishing interest rates in financial markets. But the experience in Europe with conditional lending, as with surveillance, has shown similarities with the global experience that are a source of great concern: the national reactions to programmes have become even more adversarial in Europe than for the IMF in Latin America and Asia during earlier crises. Can this conflict be dampened sufficiently over the next few years until reinforced normal surveillance becomes applicable, or will additional measures well beyond the current Treaty framework have to adopted?

During its turmoil in recent years Europe has become less active as a player in the global system – and has continued not to find a way of unifying its representation in global institutions such as the IMF and the Financial Stability Board. This is one more illustration that the primary inspiration for Europe's monetary arrangements has been internal rather than global. Progress in solving Europe's regional problems remains a prerequisite for a more active and constructive global role.

The European countries in the 1960s wanted to reform the international monetary system by making it less reliant on a single national currency. They wanted the system to make it possible to combine very stable exchange rates in their own region with low inflation, to take on more responsibility for surveillance of each other and to be assured of steady non-inflationary growth of international liquidity. In a sense their wishes have been fulfilled to excess: there is a common currency for currently 17 EU countries, they have been obliged to set up an unprecedented system of mutual surveillance, and international liquidity is more than ample. But the apparent fulfillment of their main wishes has posed massive new challenges which have to be met by their own regional efforts.

References

ANGELONI, I. *et al.*, 2011, Global Currencies for Tomorrow: A European Perspective, *Bruegel Blueprint 13*, Brussels.

COMMITTEE OF TWENTY, 1974, *International Monetary Reform, An Outline*, IMF, Washington DC.

DESPRES, E., KINDLEBERGER, Ch. and SALANT, W., 1966, "The Dollar and World Liquidity: A Minority View", *The Economist*, London 5 February, pp. 526-9.

DORNBUSCH, R., 1976, "Expectations and Exchange Rate Dynamics", *Journal of Political Economy* 84, pp. 1161-74.

FOLKERTS-LANDAU, D., and GARBER, P., 1992, "The ECB: A Bank or a Monetary Policy Rule?" in CANZONERI M.B., V. GRILLI, AND P.R. MASSON (eds.), *Establishing a Central bank: Issues in Europe and Lessons from the US*. Cambridge: CambridgeUniversity Press, pp. 86-110.

GROS, D. and THYGESEN, N., 1998, *European Monetary Integration*, Pearson Education, Harlow.

HENNING, C.R., 2010, "Coordinating Regional and Multilateral Financial Institutions", *Working Paper Series WP 11-9*, Peterson Institute for International Economics, Washington DC.

JAMES, H., 2012, *Making the European Monetary Union*, Harvard University Press, Cambridge and London.

DE LAROSIÈRE, J., 1989, "First Stages towards the Creation of a European Reserve Fund", *Report on Economic and Monetary Union in the European Community* ("the Delors Report"), Collection of Papers, Office for Official Publications of the European Communities, Luxemburg, pp. 177-84.

MCKINNON, R.I., 2013, *The Unloved Dollar Standard*, Oxford University Press, Oxford and New York.

OECD, 1966, "The Balance of Payments Adjustment Process", *A Report by Working Party* No. 3, OECD, Paris.

OECD, 1967, *Capital Markets Study*, General Report, OECD, Paris.

PADOA-SCHIOPPA, T., 1994, *The Road to Monetary Unit in Europe*, Clarendon Press, Oxford.

PADOA-SCHIOPPA, T., 2010, "The Ghost of Bancor: The Economic Crisis and Global Monetary Disorder" *Unpublished*, Lecture at Université Louvain-la-Neuve, 25 February.

PETTIS, M., 2013, *The Great Rebalancing*, Princeton University Press, Princeton.

PISANI-FERRY, J., SAPIR, A. and WOLFF, G., 2013, "EU-IMF Assistance to Euro-area Countries: An Early Assessment", *Bruegel Blueprint 19*, Brussels.

POLAK, J., 1980, "The European Monetary Fund: External Relations", *Banca Nazionale del Lavoro Quarterly Review* 134, Rome, pp. 359-81 (with comments by Pierre Languetin and Robert Mundell).

POLAK, J., 1997, "The IMF and its EMU Members" in MASSON, P.R., T.H. KRUEGER and B.G. TURTELBOOM (Eds.), *EMU and the International Monetary System IMF*, Washington DC, pp. 491-511.

RUEFF, J., 1971, *Le péché monétaire de l'Occidet*, Plon, Paris.

SERVAN-SCHREIBER, J.-J., 1967, *Le Défi American*, Denoël, Paris.

STEIL, B., 2013, *The Battle of Bretton Woods*, Princeton University Press, Princeton.

THYGESEN, N., 1997, "Relations among the IMF, the ECB and Fund/EMU Members" in MASSON, P.R.L., T.H. KRUEGER and B.G. TURTELBOOM (Eds.), *EMU and the International Monetary System*, IMF. Washington DC, pp. 512-30.

THYGESEN, N., 2000, "Evolving Ambitions in Europe's Monetary Unification" in ARTIS, M., A. WEBER and E. HENNESSY (Eds.), *The Euro: A Challenge and Opportunity for Financial Markets*, Routledge, London for SUERF, pp. 29-56.

TRIFFIN, R., 1960, *Gold and the Dollar Crisis: The Future of Conventibility*, Yale University Press, New Haven.

WERNER, P. *et al.*, 1970, *Report to the Council and the Commission on the Realization by Stages of Economic and Monetary Union in the Community* ("The Werner Report"), supplement to Bulletin II – 1970 of the European Communities, Brussels.

2. Global and Euro Imbalances: China and Germany

Guonan Ma and Robert N McCauley[1]

Abstract

We analyse global and euro area imbalances by focusing on China and Germany as large surplus and creditor countries. In the 2000s, domestic reforms in both countries expanded the effective labour force, restrained wages, shifted income towards profits and increased corporate saving. As a result, both economies' current account surpluses widened before the global financial crisis, and that of Germany has proven more persistent as domestic investment has remained subdued. The Chinese economy is an early-stage creditor country, holding a short equity position and long position in safe officially-held debt. Germany's balanced net debt and equity claims mark it as a mature creditor that provides insurance to the rest of the world, especially the euro area. China pays to lay off equity risk onto the rest of the world while Germany, by contrast, harvests a moderate yield on its net claims. In both economies, the shortfall of the net international investment position from cumulated current account surpluses suggests that total returns have been lower than current yields, owing to exchange rate changes, asymmetric valuation gains, and, in Germany's case, credit losses.

Keywords: Global imbalances, current account, capital account, saving and investment, international assets and liabilities, distribution of income, world banker

JEL classification: F15, F32

2.1. Introduction

Fifty years ago, when cars were growing rear fins, Triffin (1960) flagged a source of instability in the international monetary system. Since Bretton Woods used the US dollar as international money, US short-term liabilities to the rest of the world needed to grow to finance global trade. Such growing liabilities would eventually exceed the US gold stock, undermining confidence in the dollar's peg to gold and setting off a run. (Salant and Henderson (1978) turned this into a speculative attack model.)

Kindleberger (1965) countered that the US was just serving as banker to the world, exchanging short-term liabilities for long-term assets. That left open the

[1] The authors thank Lillie Lam, Marjorie Santos and Jimmy Shek for their excellent research assistance, and Morten Balling, Stephen Cecchetti, Hans Genberg, Ernest Gnan, Ulrich Grosch, Dong He, Liam Maxwell, Roberto Tedeschi, Blaise Gadanecz and Haiwen Zhou for discussion. The views expressed are those of the authors and not necessarily those of the Bank for International Settlements.

question of how a run on this bank could be handled: the international lender of last resort. In *Manias, Panics and Crashes*, Kindleberger cited central bank cooperation as allowing the Bank of England to meet such a run, given London's similar maturity mismatch (Kindleberger and Aliber, 2005).

This argument with Triffin became moot in the 1980s, when the US began to run current account deficits. Kindleberger interpreted these as a bank eating its own capital (its net foreign assets), undermining confidence in the bank's liabilities[2].

Then, a neo-Triffin argument arose. Aliber saw the US as the nth economy, providing global consistency. If the N-1 economies ran current account surpluses, the US would run the corresponding deficit. If the N-1 economies sought too large current account surpluses, US manufacturing would suffer. An unsustainable rise in US international indebtedness would undermine the value of its external liabilities[3].

In the event, although the US net international liability position has reached 28% of GDP, the US has not made net investment payments. This observation has led to a revival of the Gaullist phrase "exorbitant privilege", which was coined when the US current account was in surplus and originally referred to the capacity of the United States to buy European companies and factories with Treasury bills. That the US international assets yield more than its liabilities is often ascribed to the role of the US dollar. In fact, the difference nowadays arises from differences on the rate of return on direct investment into and out of the United States. The stock of direct investment in the United States is of more recent vintage than US direct investment abroad and grows with acquisitions that pay up for underperforming companies (Laster and McCauley, 1994).

As a result we live in a world in which the largest economy accommodates the current account swings of the rest of the world, consistent with Aliber's reinterpretation of Triffin. For instance, after the Latin American crisis of the 1980s or the Asian financial crisis of the late 1990s, the US current account absorbed most of the change in others' current accounts. But because of the repeated game of non-US companies, yesterday Japanese, today Chinese, losing money on US firms and assets, the arrangement involves little Triffinesque instability.

Thus, this chapter can describe the evolution of current account surpluses in China and Germany in recent years in terms of their own internal economic dynamics and policies, in the context of increased international economic integration. The next section places these surpluses, the largest and second largest in the

[2] Despite their different interpretations, Triffin and Kindleberger both focused on gross international assets and liabilities. Much current discussion of global imbalances focuses on net capital flows, that is, current accounts. Events have proven that international imbalances cannot be understood only in net terms. See Borio and Disyatat (2011) and Shin (2012).

[3] More recently, a fiscal neo-Triffin argument has gained adherents. The world accumulates US government (and agency?) securities as safe assets. But in a world growing faster than the US, if the US government meets the demand for safe assets, it would raise its debt unsustainably, undermining its safety.

world, in the global context. The following section suggests that in both cases domestic reforms restrained wages, shifted income towards profits, increased corporate saving and widened the current account surplus. The next section compares China and Germany as creditor countries, providing a global perspective, examining the split between safe and risky assets, distinguishing the role of the official sector and analyzing the returns on their net claims. The final section sets out the global and European policy setting and concludes.

2.2. CHINESE AND GERMAN SURPLUSES IN A GLOBAL PERSPECTIVE

Global current account imbalances peaked in 2006 before the global financial crisis. That year, the countries and groups of countries shown on Figure 2.1 collectively ran surpluses and deficits in excess of 2% of global GDP each. These imbalances were larger than those seen in the cyclic peaks of the mid-to-late 1980s or the late 1990s.

One consistent feature of global imbalances since 1984 has been the role of the US economy in running the largest deficit. Only the official transfers associated with the Gulf War and the slow growth of the US economy in the early 1990s interrupted this feature.

Less consistent has been the role of the Japanese surplus. This served as the most important counterpart to the widening US deficit in the early 1980s, only to diminish as the Japanese bubble in equities and real estate pumped up corporate investment in the late 1980s. The Japanese surplus widened again after the bubble burst in the 1990s and Japanese firms shifted to investing well less than their cash flows. Most recently, the Japanese surplus has narrowed as ageing households have reduced their savings and higher energy imports have replaced nuclear power in the wake of the 2011 earthquake. Japan has begun to live on its net international investment income.

More inconsistent still have been the deficits and surpluses of emerging Asia other than China. They tended to run deficits before the Asian financial crisis of 1997-98 and surpluses since. In 2012, their surplus virtually disappeared on the back of weaker exports and less favourable terms of trade, or alternatively owing to a combination of lower saving and higher domestic investment.

What later became the euro area other than Germany ran deficits in the early 1980s in the early years of President Mitterrand's term, followed by approximate balance before the deficits leading up to the ERM crisis of 1992. There then followed surpluses before the substantial deficits after the inception of the euro and then again after the expansive fiscal response to the global financial crisis.

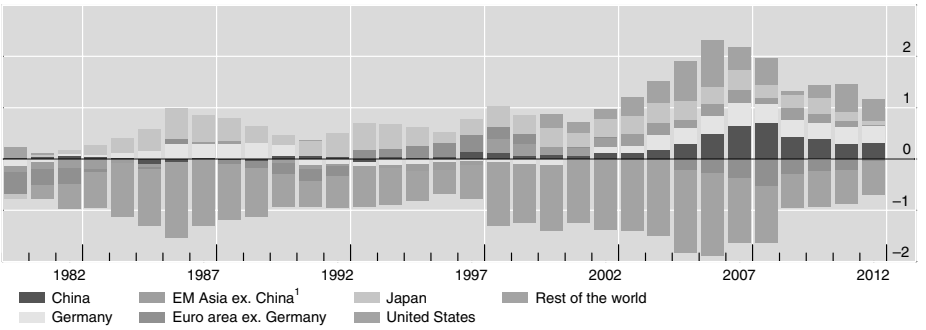
Adjustment of spending and wages in the periphery eliminated the deficit of the euro area ex Germany by 2012.

The German surplus of the 1980s gave way to a deficit in the 1990s as construction spending in the east more than absorbed the flow of savings. Germany drew down a net international investment position built up after the Second World War to finance the reconstruction. After much domestic reform, the current account swung back into surplus in the 2000s, facilitated by the advent of the euro. In 2012, notwithstanding the adjustment of deficits elsewhere in the euro area, the German surplus was the largest in the world.

In a global context, the Chinese surplus is a very recent phenomenon and it has already narrowed substantially since the global financial crisis. It surged in the 2000s to above 10% of Chinese GDP and 0.7% of global GDP in 2007 but in 2012 narrowed to 2.3% of Chinese GDP and less than a quarter percent of global GDP.

Geographically, China runs its surplus mostly vis-à-vis other continents (notably North America), and runs deficits in Asia. By contrast, Germany runs its surplus both within and without the euro area. China serves as a final assembly stop of the whole Asian supply chain, while Germany exports both capital goods like machines and final consumer products like BMWs to both the euro area and outside.

Figure 2.1: Current account balances (as a percentage of world GDP)



[1] Hong Kong SAR, India, Indonesia, Korea, Malaysia, Philippines, Singapore and Thailand.

Source: IMF, World Economic Outlook.

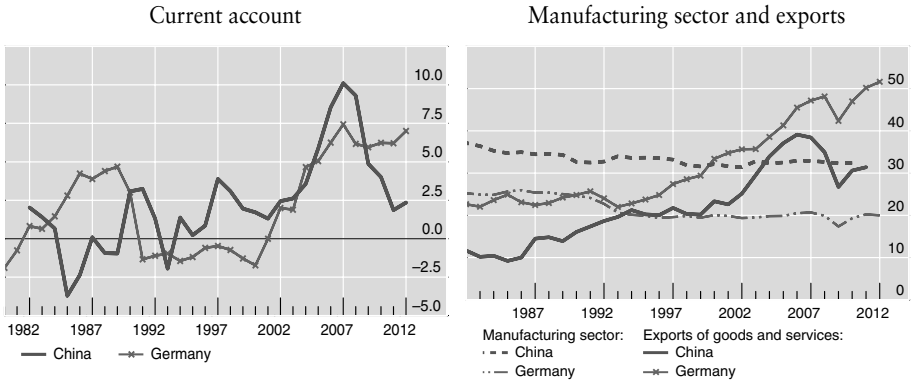
In sum, the German current account surplus now exceeds that of China both in dollar terms and as a share of own GDP.[4] The German current account is almost

[4] Over the period 1970 to 2009, Aizenman and Sengupta (2011) found that the Chinese and German current account surpluses in relation to GDP responded nearly one-to-one to the lagged US current account deficit to GDP. The shrinkage of the Chinese and US current accounts is consistent with this finding but the behaviour of the German current account is not.

three times larger than China's in relation to respective GDP (Figure 2.2, left-hand panel) and, as we shall see below, the German economy has depended more on net exports for its growth, especially since the global financial crisis.

These surpluses both arose in the two economies that are quite open, with exports a third of Chinese GDP and half of German GDP (Figure 2.2, right-hand panel)[5]. Moreover, while Engel's Law leads us to expect a larger manufacturing sector in China's economy, the 20% share of manufacturing in Germany's advanced economy stands well above US, French and UK shares in the low teens.

Figure 2.2: Current account, manufacturing sector and exports (as a percentage of GDP)



Sources: Lane and Milesi-Ferretti (2007), IMF International Financial Statistics, World Economic Outlook

2.3. WHERE DID THE SURPLUSES COME FROM?

Domestic reforms in China and Germany had parallel effects of restraining wages, leading to stable unit labour costs, rising profit share and current account surplus into the mid-2000s. Both economies' exports also benefited from international integration, China into the WTO and Germany in the euro area. Exchange rate movements have tended to narrow the Chinese more than the German surplus. Of the two economies, Germany's growth has recently depended more on net exports.

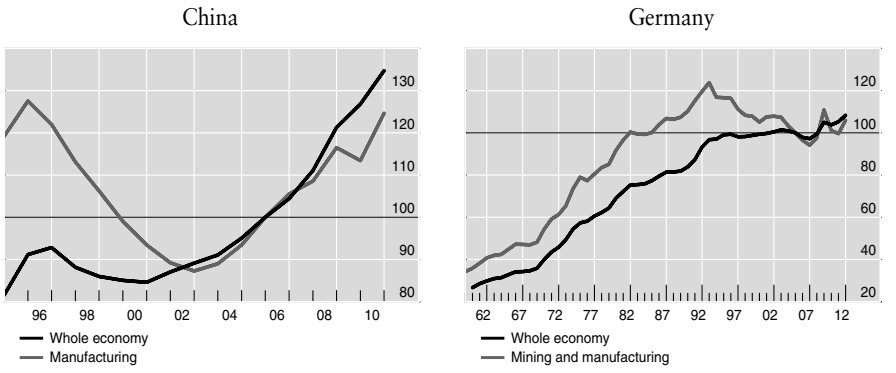
[5] Everyone knows that China's large export processing sector imports parts and produces the latest Apple product. Recently released data from the OECD and WTO therefore surprise with the news that in 2009, China's value added as a share of its exports is 68%, similar to Germany's 72%. They compare to Japan's 80%. Multiplying the value added share by the export share yields an export value-added of 21% of own GDP for China and 37% for Germany. Thus the share of the German economy devoted to exports far exceeds that of the Chinese economy.

2.3.1. Reform Restrains Labour Costs, Boosts Profits, Savings and Surpluses

Though at very different levels of development, China and Germany implemented domestic reforms that had similar effects in terms of increasing the effective supply of labour. The Lewis model came into play in both cases: growing employment did not push up wages and much of the benefit of productivity growth went to profits. For China, surplus labour tied down on the farms and employed at inefficient state enterprises was released and attracted to labour-intensive export processing opportunities in the coastal areas. For Germany, it was a temporary return to the dynamics sketched by Kindleberger in *Europe's Postwar Growth* (1967).

Though having parallel effects, domestic reforms differed. In China, they included the break-up of the rural communes into the early 1990s, and Zhu Rongji's corporate restructuring in the late 1990s, which almost halved employment at state-owned firms (Ma, *et al.*, 2013). In Germany, after the initial boom of re-unification, labour leaders in the late 1990s agreed to hold wage growth below that of productivity (Flassbeck, 2007). This was followed up by the Schroder Agenda 2010 reforms, against the backdrop of German investment in central and eastern Europe. In particular, the Hartz and other reforms in the early to mid-2000s reduced the payroll tax for low-pay jobs and trimmed unemployment benefits in Germany (Hüfner and Klein, 2012).

Figure 2.3: Unit labour costs (2005 = 100; in nominal terms)

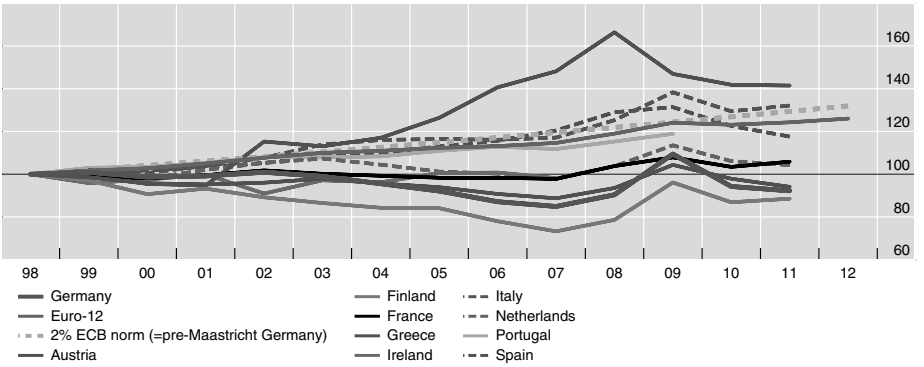


Sources: National data; authors' calculations.

As a consequence, unit labour costs stagnated or fell from the late 1990s to the mid-2000s in China and Germany (Figure 2.3). This tended to strengthen the competitiveness of manufactured exports for both economies. With the introduction of the euro, the evolution of unit labour costs determined the competitiveness

of the euro-area economies. The often-plotted unit labour cost divergence in the euro area from its inception shows that German unit labour costs hardly fell, while those of other countries in the euro area rose considerably (Figure 2.4).

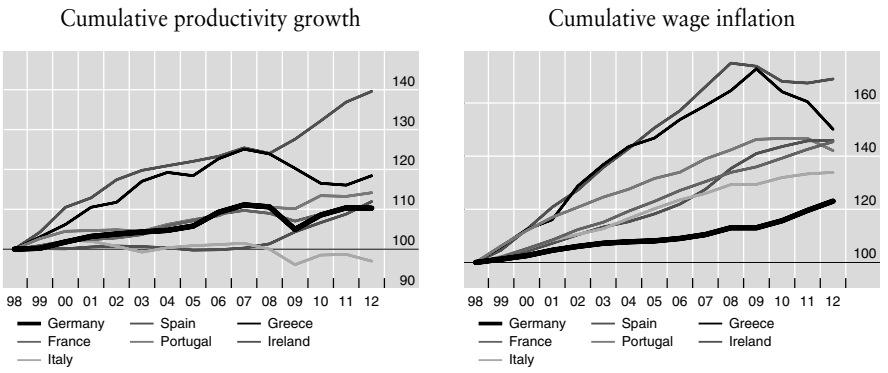
Figure 2.4: Unit labour costs under the euro (1998 = 100; nominal, whole economy)



Sources: Eurostat Ameco database; authors' calculations

This evidence leaves open the question of whether the German economy enjoyed rapid productivity growth as a result of the reforms, or whether the domestic reforms that expanded the effective supply of labour (and the threat to move production east) served mostly to hold down nominal wages. In fact, Germany gained competitiveness within the euro area through 2007 notwithstanding its middling productivity growth (Figure 2.5, left-hand panel). What set Germany apart from the rest of the euro area was weak wage growth (Figure 2.5, right-hand panel).

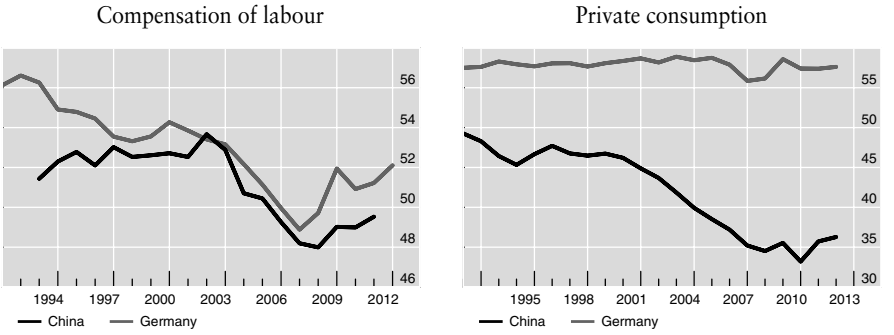
Figure 2.5: Productivity and wages in the euro area (1998 = 100; whole economy)



Source: OECD, *Economic Outlook 92*, December 2012

In both economies, the combined effect of these labour market developments was to shift the distribution of income away from wages and towards profits. The left panel of Figure 2.6 shows that the labour share in national income fell considerably in the 2000s in both economies. This is a matter of not only external competiveness but also carries important implications for the structure of domestic absorption (Ma and Wang, 2010). A fall in the labour share tends to restrain private consumption and to boost the domestic saving rate. For a given level of domestic capital formation, therefore, the current surplus widens. One interesting observation is that, in contrast to China, a decline in Germany's labour share was not accompanied by a fall in its private consumption-GDP ratio in the same period (see Figure 2.6; right-hand panel).

Figure 2.6: Labour share and private consumption (as a percentage of GDP)

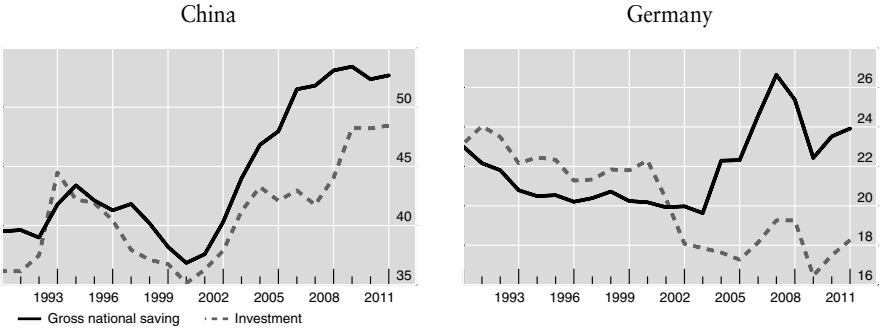


Sources: IMF, World Economic Outlook; national data.

The lower wage share and higher profit share led classically to higher corporate and overall savings in the 2000s in both economies. In principle, a nation's current account balance is the same as the domestic saving-investment gap, so the gap in Figure 2.7 offers a perspective on the current surpluses in Figure 2.2. China's gross investment share rose unevenly, opening a wide gap against saving before the global financial crisis that narrowed in its aftermath. But Germany's investment rate declined unevenly but persistently in the 2000s, (Fratzscher, 2013; and Posen, 2013) resulting in a saving-investment gap, or equivalently, a persistent current account surplus.

Evidence on the sectoral saving-investment balances is hard to read for China but in the case of Germany is consistent with higher profits leading to the emergence of the current account. In China net business borrowing did decline in the 2000s and rose again in 2009, but the timing does not line up with the peak in the current account surplus in 2007 (Figure 2.8, left-hand panel). In Germany, the corporate sector shifted from borrowing 6% of GDP at the peak in the early 2000 to lending 2-3% of GDP in the late 2000s, thus helping drive a larger current account sur-

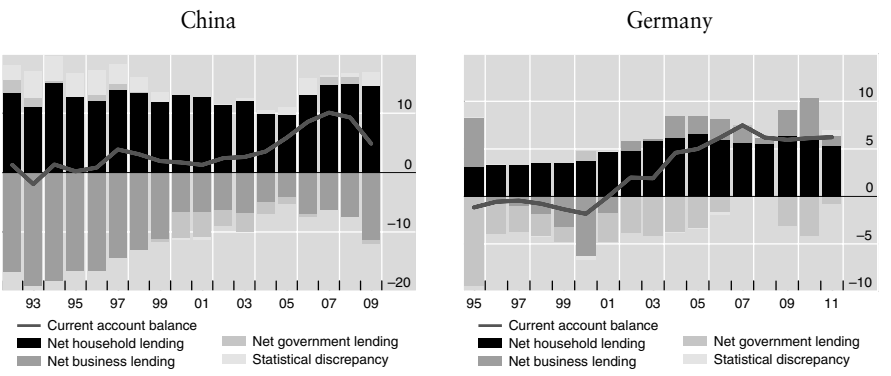
Figure 2.7: Gross national saving and investment (as a percentage of GDP)



Sources: CEIC.

plus[6]. The fruits of wage moderation and labour market reforms were not invested domestically but instead funded the accumulation of net foreign assets.

Figure 2.8: Net lending by sector (as a percentage of GDP)



Statistical discrepancy defined as the difference between the current account and the sum of the three sectors' net lending.

Sources: CEIC; Eurostat; authors' calculations.

2.3.2. The Contribution of Exchange Rate Changes

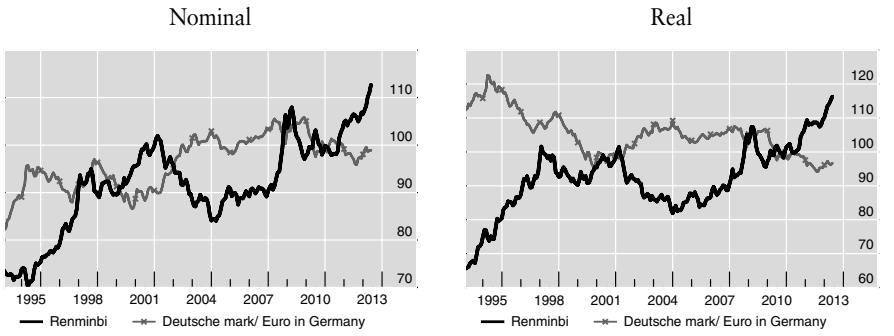
The dynamics of the nominal and real effective exchange rates of the two economies may have also contributed to the movements in the two current account balances. Over the past 15 years, the nominal and real effective exchange rates of the renminbi appreciated by 50% and 70%, respectively, albeit from a base of significant undervaluation in the mid-1990s (Figure 2.9). Much of this currency

[6] As noted above, private consumption was remarkably steady in Germany, given the decline of the labour share. German households maintained consumption and their net lending by cutting down investment.

appreciation took place after the mid-2000s, likely contributing to the eventual and sizable shrinking of Chinese current surpluses from a 2007 peak (Ma, *et al.*, 2013).

In comparison, the Deutsche mark and then the German euro gained 15% in nominal terms but, given restrained consumer prices, actually weakened by more than 15% in real terms over the entire period. Since the mid-2000s, Germany's nominal exchange rate has shown no trend and its real effective exchange rate has depreciated. Germany's nominal and real effective exchange rates have appreciated only in 2012-13. Hence the narrowing of China's current account and the persistence of Germany's following the global financial crisis seem consistent with the divergent movements in their currencies. This observation would be strengthened if one were to measure real exchange rates using relative unit labour costs (Ma, *et al.*, 2013). However, it is important to keep in mind that during the 2000s, China's official foreign exchange reserves increased massively, while the euro's exchange rate floated freely, an issue to which we return below when discussing the role of the public sector in managing international assets.

Figure 2.9: Effective exchange rates (2010 =100)



Sources: BIS.

2.3.3. Reinforcement by WTO for China and Euro for Germany

Both countries enjoyed special circumstances in the 2000s that gave extra scope to their exporting firms, allowing both to take better advantage of the global upswing at the time. For China, acceptance of the terms of entry into the WTO sent a signal to multinational firms of a commitment to the international trading system even as it gave Chinese exporters better market access by placing restraints on trading partner responses to surges of imports from China. As part of the preparation for the WTO accession, a wave of domestic restructuring and market liberalisation in China also helped enhance efficiency and productivity. Hence

both demand and supply factors widened Chinese current surpluses (Ma and Wang, 2010).

Gros and Mayer (2012) argue that the advent of the euro permitted the German economy to run a wider current account surplus. Before the euro, they argue, the German economy had difficulty in recycling current accounts above 4% of GDP. With German banks basically unable to take long foreign exchange positions, when the current account reached levels that tested the limits of the long positions that insurance companies and firms would accept, the Deutsche mark would be periodically revalued. This would lead to higher real wages, a loss of competitiveness, lower profits and lower savings. This "pattern [was] interrupted" as Gros and Mayer put it, by reunification, which gave rise to higher domestic investment expenditure and led to current account deficits that wiped out the net foreign assets built up over a generation.

According to these authors, the advent of the euro meant that German surpluses could be deployed within the euro area without requiring banks or investors to take foreign exchange risk. To be sure, they took credit risk by recycling surpluses within the euro area, but not currency risk. The result was that the German surplus could reach almost 8% of GDP in 2007. The other side of the same coin is that some peripheral euro area economies ramped up their consumption and investment in response to lower interest rates and easier financing in the monetary union, leading to large current deficits (Hallet and Martinez Oliva, 2013).

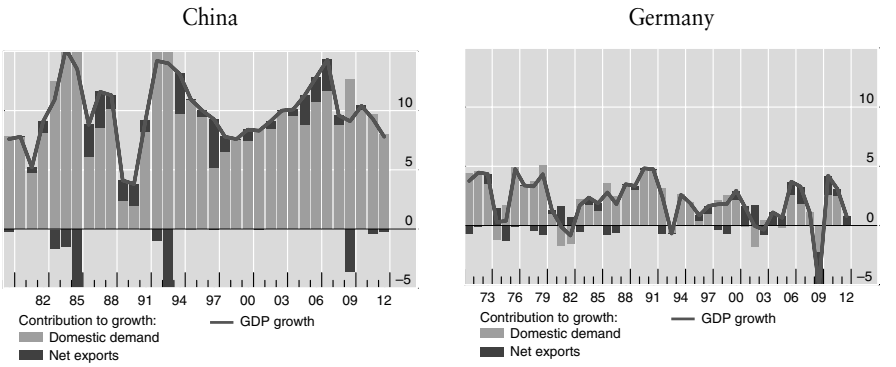
2.3.4. Growth Dependence on Net Exports

As these two current accounts widened, the two economies depended more on net exports for their growth, but not to the same extent. Not only is Germany more oriented towards exports than China, but also growth in Germany in the 2000s relied more on net exports than growth in China. A straightforward decomposition of the real GDP growth of the Chinese and German economies shows the latter much more dependent on net exports (Figure 2.10). The contrast is particularly striking in the years since the global financial crisis, 2010-12.

2.4. HOW ARE THE FOREIGN ASSETS INVESTED?

Having explored where the two current surpluses have come from, we next seek to compare how these surpluses have been invested. We first place the two external balance sheets in a global perspective, then examine their asset compositions, and contrast the public-sector roles in managing international assets. Finally, we come to the question of returns on China's and Germany's international investments.

Figure 2.10: Decomposition of real economic growth in China and Germany (in per cent and percentage points)



The left panel truncates some observations to keep the Figure range in bounds.

Sources: United Nations, IMF, *World Economic Outlook*, October 2012; authors' calculations.

2.4.1. Two International Balance Sheets in a Global Perspective

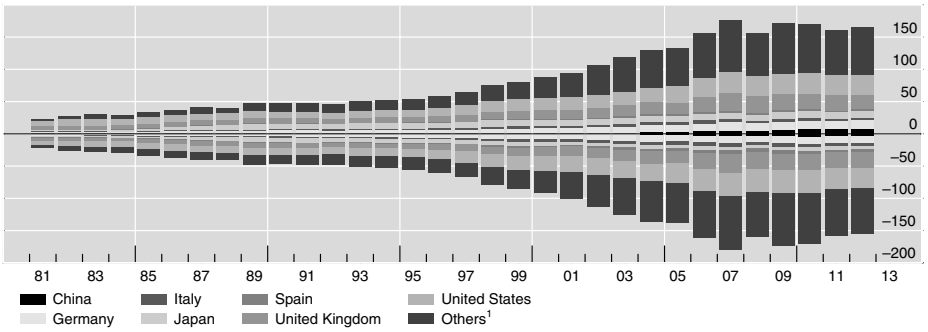
For a generation, international investment positions, both assets and liabilities, have been growing relative to GDP globally (Figure 2.11). This international financial deepening was taken as a sign of globalisation (Lane and Milesi-Ferretti, 2003); Chairman Greenspan likened it to an expanding universe. If the stock of capital in an economy is around 400% of GDP, then perfect risk-sharing would suggest that the stocks of assets should approach that multiple of global GDP. On this view, by 2007, we were half way to proper risk sharing[7].

Though these accumulating stocks show much less cyclical variation than the global imbalances plotted in Figure 2.1, they nevertheless convey a similar message about recent developments. The process of widening flow imbalances and the process of ever-deepening stocks of assets and liabilities was at least interrupted by the global financial crisis and subsequent strains in the euro area.

Shifting from the time series to the cross-section, Germany's international balance sheet is the third largest in the world behind that of the United States and United Kingdom, and larger than that of Japan. China, now the world's second largest economy, has a relatively small international balance sheet. As a share of respective GDP, the sum of Germany's external assets and liabilities is five times as big as that of China (Figure 2.12, left-hand panel). This difference in financial open-

[7] The authors are indebted to Stephen Cecchetti for this perspective. Of course, if account is taken of the limited risk sharing in cross-border holdings of fixed income instruments, the progress towards thoroughgoing global risk-sharing would be assessed as more limited.

Figure 2.11: International investment positions of all countries (as a percentage of world GDP)



[1] Sum of 110 economies

Sources: IMF, *International Financial Statistics* and *World Economic Outlook*; BIS calculations.

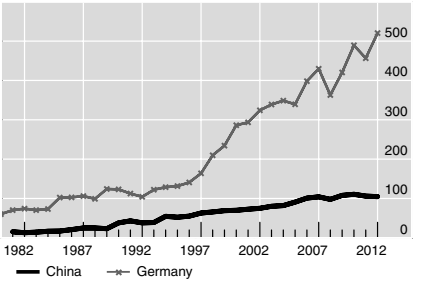
ness is mostly because of China's lower level of income, (Ma and McCauley, 2013), though capital controls may also account for the gap between the Chinese observation and the regression line representing a log-linear Kuznets curve (Figure 2.12, right-hand panel).

However, in dollar or euro terms, China's net external position surpassed that of Germany in the early 2000s, and exceeded USD 1.7 trillion at end-2012. Germany's net position approached USD 1.4 trillion in 2012, and is catching up thanks to its recently wider current account surpluses. China's international wealth has arisen at a middle-income GDP per capital of about USD 6,000, a seventh of Germany's per capita GDP of USD 44,000 in 2012. China and Germany have now become the second and third largest creditor nations in the world after Japan (Ma and Zhou, 2009).

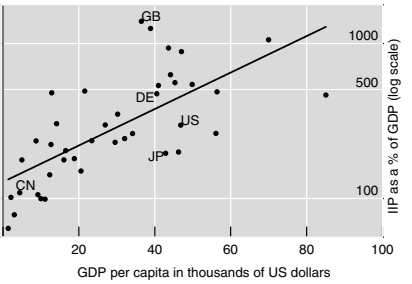
Despite these differences, the rise in these two net creditor positions in relation to respective GDP tracked each other very closely in the years before the global financial crisis (Figure 2.13, left-hand panel). Since then, with the narrowing of the Chinese current account surplus, its net position grew only by a half, and did not keep up with the doubling of nominal GDP in dollar terms between 2007 and 2012. As a result, the Chinese net position has fallen significantly in relation to GDP. In contrast, the German net position continues to rise given sustained large current surpluses.

Figure 2.12: International investment position[1]

As a percentage of GDP



Against per capita GDP as of 2010[2]

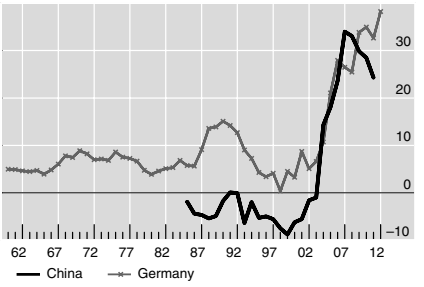


[1] Sum of assets and liabilities. [2] Sum of assets and liabilities, including reserves. Sample includes major emerging economies and OECD members excluding Ireland and Luxembourg. Logarithm to the base 10 of ratio of international investment position to GDP.

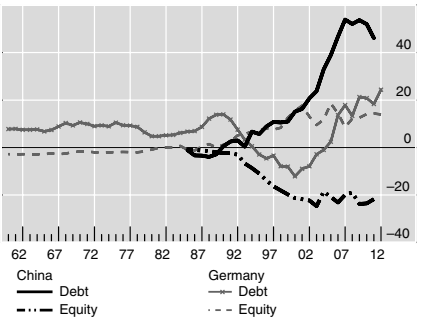
Sources: Lane and Milesi-Ferretti (2007); CEIC; IMF *International Financial Statistics*, *World Economic Outlook*.

Figure 2.13: Net international investment position (as a percentage of GDP)

Net international investment position



Net debt and equity assets[1]



[1] Equity is calculated as FDI, portfolio investment in shares and portfolio investment in mutual fund shares. Debt is assumed as all others.

Sources: CEIC; Datastream; national data; authors' calculations.

2.4.2. Split between Debt and Equity or Safe Assets and Risky Assets

Similarity in their net creditor positions as share of respective GDP, however, masks vast differences in the two economy's net positions in debt and equity instruments. The Chinese authorities have revealed a preference for buying insurance from the rest of the world through its external position, while German banks, companies and insurers have taken a balanced debt and equity stake in the rest of the world. China has allowed foreign firms a large stock of direct investment in the country, while its official investors have favoured safe assets in major

reserve currencies. The resulting short-equity, long-debt position (Lane and Schmukler, 2007; Ma and Zhou, 2009) shifts macroeconomic risk from China to the rest of the world (Figure 2.13, right-hand panel). By contrast, Germany takes on equity risk with a net debt/equity allocation of about 60%/40%, like a college professor approaching retirement.

China's position, characteristic of emerging markets, provides steady income on its assets rain or shine, and reduced payments during a downturn. With foreign firms producing half its exports, lower exports and employment in the export sector during a global recession are hedged to some extent by lower profits earned by foreign firms. Such insurance is costly, as we shall see below, and China actually earns negative income on its sizable net foreign assets. In this respect, China is the mirror image of the United States, with its still positive international investment income on its sizable net liability position.[8]

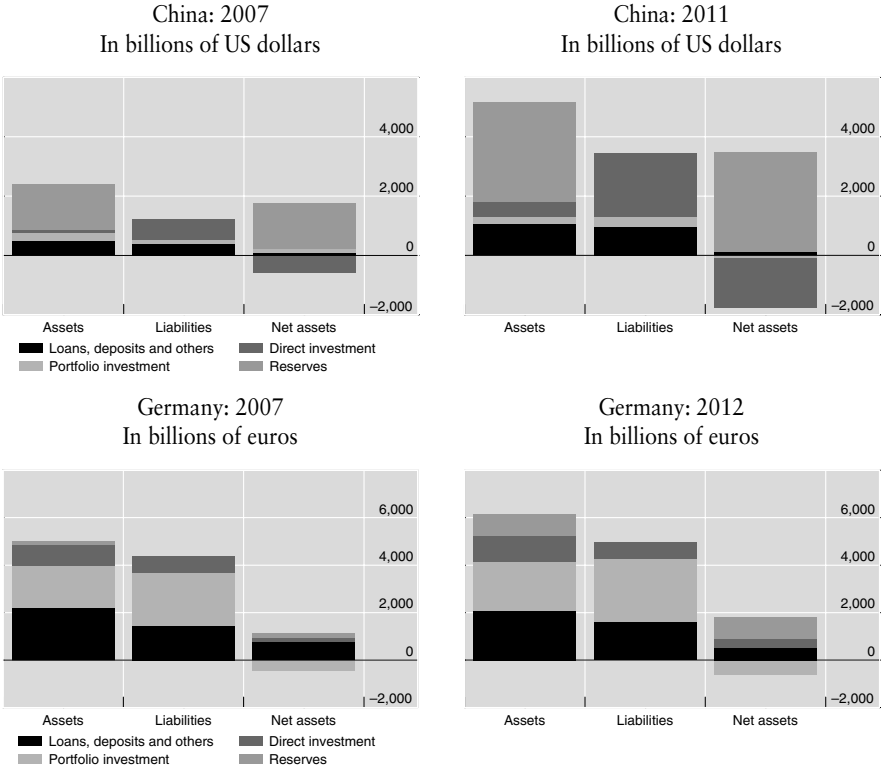
Germany's position has evolved over time. During the 1960s and 1970s, Germany resembled China today in holding a long debt/short position against the rest of the world. It was beginning to move from immature creditor to mature creditor when the Berlin Wall fell. It continued on this path as it continued to build up equity claims while running its net debt claims negative to pay for fiscal transfers and a real estate boom after reunification. When wage restraint in the late 1990s returned the current account to surplus in the early 2000s, net debt claims turned up. They overtook net equity claims before the global financial crisis, leaving Germany today with its net claim on the rest of the world heavier in debt than equity, at least at equity prices at end-2012. It earns net investment income on this balanced portfolio, as we shall see below.

The composition of the international balance sheets by instrument in 2007 and 2012 highlights three further differences (Figure 2.14). First, banks play a much larger gross and net role in Germany than in China. That said, the role of banks in Germany's net assets has declined since the global financial crisis and especially the euro area crisis. Second, the role of portfolio investments into and out of Germany well exceeds that in China, with the latter's tight controls on inflows and outflows. On the liability side is the large foreign official holding of German government bonds. Germany, despite its growing net external assets and relatively favourable fiscal dynamics, provides safe, reserve assets to the rest of the world, just like the US economy debated by Triffin and Kindleberger. The Chinese authorities have just gingerly begun to open up their domestic bond market to selected foreign official investors. Third, official reserves bulk very large in

[8] It has been suggested that China's net international investment returns are exaggerated, which would imply an overstatement of its current account surpluses and creditor position. In particular, Zhang (2009) holds that official statistic undercount the retained earnings of foreign firms operating in China. In recent years, the Chinese authorities appear to have made an effort to account better for such retained earnings in computing China's international liabilities as well as the corresponding adjustments for the balance of payments statistics.

China's assets, but they formerly played a very minor role in Germany's assets, although they now play a larger role. The next section expands on this.

Figure 2.14: Composition of China's and Germany's external assets and liabilities



Sources: CEIC; Datastream.

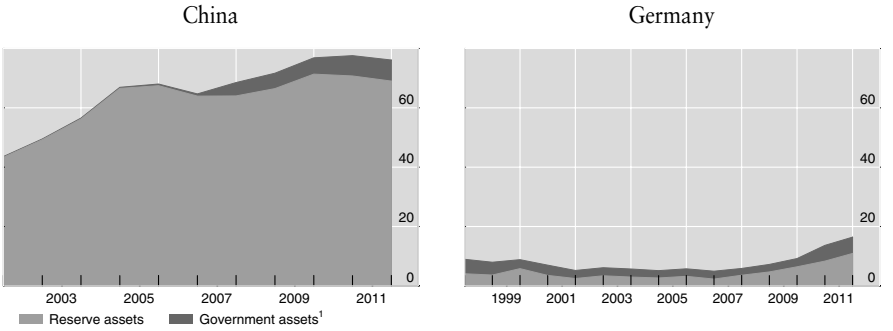
2.4.3. Split between Private and Public Sector

The difference in risk appetite of the mostly public-sector managers of China's external assets as compared to that of the mostly private-sector managers of Germany's external assets underlies the marked differences in the equity compositions just reviewed. The euro crisis and its management, however, have led to a narrowing of the gap between the roles of the official sector in holding external assets.

In 2007, the official investment of the gross external assets of China stood in stark contrast to the private investment of Germany's gross external assets. We have constructed preliminary estimates for the international assets held by the public sector as a sum of the traditional official reserve assets held by the central bank

and some proxy of international assets held by other public agencies for both China and Germany (Figure 2.15). In China, public-sector asset managers (mostly the State Administration of Foreign Exchange) invested some two thirds of China's gross international assets. By contrast, in 2007 Germany's public-sector managers handled about 5% of Germany's international assets. This contrast makes very clear the difference in the role of government in the two economies.

Figure 2.15: International assets held by the public sector in China and Germany (as a percentage of total international assets)



[1] International assets held by the government and public agencies other than the central bank. In China's case, it is estimated as the sum of China Investment Corporation's (CIC) non-Huijin assets, loans extended by China Development Bank (CDB) to borrowers outside the mainland China, and export buyers' credit extended by China Export and Import Bank (China EXIM Bank). In Germany's case, it is proxied as the sum of the international assets held by the government and 25% of KfW's total assets.

Source: CEIC; national data; annual reports of KfW, CIC, China EXIM Bank and CDB, and authors' calculations.

Since the onset of the global financial crisis in mid-2007, there has been a rising trend in the share of international assets under the management of the public sector in both economies. In China, the share of official reserves has grown somewhat. But much of the growth of the public sector share resulted from the policy banks' external loans in support of Chinese imports, particularly commodities, and exports. In addition, the sovereign wealth fund has invested in riskier assets in pursuit of higher returns. All-in-all the public share rose to three-quarters.

In Germany, the growth of the public share owes less to the government agency, KfW, and more to the assets of the central bank. Between 2007 and 2012, both the North Atlantic crisis and the euro crisis led to a retrenchment of bank credit. German banks that had borrowed dollars to invest in US private-label mortgage-backed securities (later known as toxic assets) reduced dollar assets. As concerns over counterparty risk spread in the interbank market, German bans cut back their claims on other euro area banks. And as concerns for the credit of sovereigns

in the periphery grew in 2010-12, German banks cut back on claims on sovereigns and firms in these countries. Updating Cecchetti *et al*. (2012), German banks alone cut consolidated claims on borrowers in Greece, Ireland, Italy, Portugal and Spain by over EUR 300 billion between the first quarter of 2008 and the last quarter of 2012.

As peripheral banks lost direct access to German and other commercial banks in Germany, they drew on Eurosystem credit, and the Bundesbank became its biggest creditor. As the euro-denominated interbank market dried up and peripheral banks repaid rather than rolled over maturing bonds, they drew on the Eurosystem for credit.

The result was a shift in the composition of the German claims on the rest of the world in the Chinese direction. What had been private claims became, through the operation of the Eurosystem's credit operations and TARGET2 payments system, public claims. As a result, the federal public sector now accounts for an estimated 15% of Germany's external assets.

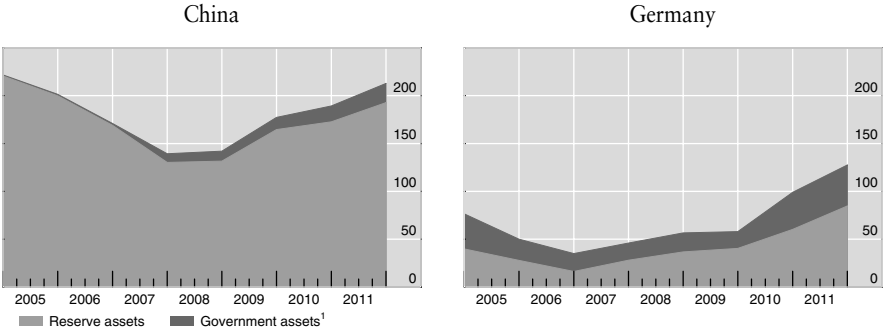
The public-sector role is further magnified through the lens of net international investment position for both economies. Recall that the German international balance sheet is five times larger than its Chinese counterpart in relation to GDP. Chinese public-sector managers invested twice as much as the Chinese net external assets, recycling not only China's current account surpluses, but also her net direct investment liability (Figure 2.16, left-hand panel). In other words, China's public sector runs a creditor position twice as large as China's overall net international investment position, while her private sector's net debtor position rivals the size of China's overall net creditor position. Meanwhile in Germany, the public sector managed more than all the country's net international claims by 2012 (Figure 2.16, right-hand panel).[9] Measured in terms of nets rather than gross claims, the role of the German public sector becomes larger and has converged more towards the role of the Chinese public sector.

2.4.4. Rates of Return on Foreign Assets

We have already seen that China is laying off equity risk with its international assets and liabilities while Germany is taking on equity risk with its. Over extended periods, one expects China to pay and Germany to profit from their respective patterns of international risk sharing. Indeed, in some ways, China's position is the mirror image of the US's position. High returns on US direct investment abroad have been the most important factor in keeping the US net invest-

[9] European Commission (2012a, p.33) shows that the rise in TARGET2 claims resulted in a similar fraction of Dutch net foreign assets in the Central Bank at end-December 2011 and an even larger fraction in Finland.

Figure 2.16: International assets held by the public sector in China and Germany (as a percentage of net international investment portfolio)



[1] International assets held by the government and public agencies other than the central bank. In China's case, it is estimated as the sum of China Investment Corporation's (CIC) non-Huijin assets, loans extended by China Development Bank (CDB) to borrowers outside the mainland China, and export buyers' credit extended by China Export and Import Bank (China EXIM Bank). In Germany's case, it is proxied as the sum of the international assets held by the government and 25% of KfW's total assets.

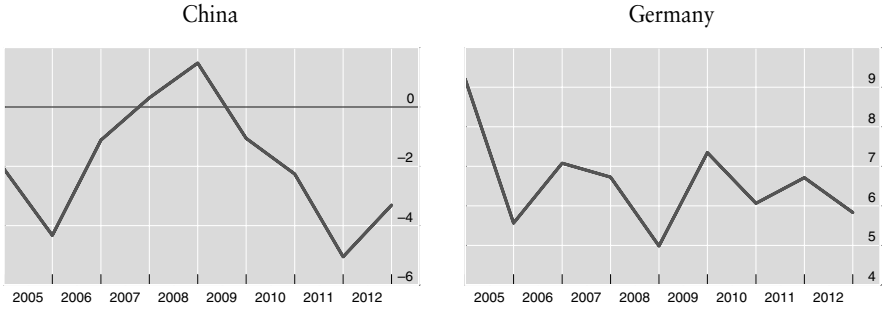
Source: CEIC; national data; annual reports of KfW, CIC, China EXIM Bank and CDB, and authors' calculations.

ment income positive (Curcuru *et al.*, 2013), even as the US net international investment position has become increasingly negative. China pays so much higher a return on the USD 1 trillion of direct investment liabilities than she receives on her assets that she records net international investment *payments* on USD 1.8 trillion of net assets.

To assess the performance of China's and Germany's external assets, one needs to consult both the yields and capital (or valuation) gains and losses, including those arising from exchange rate changes: the total return. The Chinese report net international investment *payments* in most years in the 0 to 4% range (a negative yield in Figure 2.17, left-hand panel). Consistent with the risk-sharing described above, the exception is the global financial crisis year, 2008. If these data do not include capital gains on the SAFE's portfolio of high-quality government bonds, then they understate the total return that year. For Germany, net investment income is generally between 6% and 8%. With an international balance sheet that takes on equity risk, it is not surprising that the worst year is 2008.

Things look worse, however, when valuation and capital gains and losses are also considered. Obstfeld (2012) shows that year-to-year changes in net international assets are not strongly correlated with current accounts, but in our two cases the discrepancies have persisted. China's net international assets have since the crisis grown by less than the sum of her current account surpluses or net capital outflows (Figure 2.18, left-hand panel). By 2012, the gap reached RMB 1.5-2.5 tril-

Figure 2.17: Net investment income



as a % of net international investment position

Sources: Lane and Milesi-Ferretti (2007); CEIC; Datastream; national data.

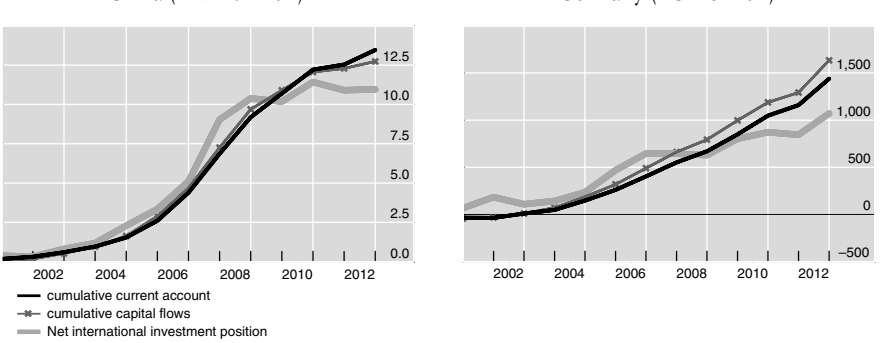
lion, 3-5% of GDP. If anything, the gap is puzzlingly small. After all, the renminbi has risen from 8.3 to 6.3 to the dollar, while China's external assets are mostly in US dollars and her liabilities are largely renminbi-denominated (not least the foreign direct investment in China). On a conservative assumption that 10% of total international assets and only equity liabilities are in renmimbi, China's net long dollar (and euro) exposure would be twice that of its net international investment position in 2012. On this basis, the appreciation of the renmimbi against the US dollar from 2005 could account for a RMB 7 trillion shortfall, equivalent to 14% of 2012 GDP! We expect the revisions of the 2012 Chinese international investment position to increase the direct investment liability and thus to increase the stock-flow discrepancy.

The stock-flow discrepancy is larger in the case of Germany (Figure 2.18, right-hand panel). Judging from the current or the capital accounts, one would imagine that Germany's net international position could be hundreds of billions of euros larger. Starting in 2002, when Germany's current account turned positive again, the current account surplus has cumulated to EUR 1.4 trillion by 2012[10]. The cumulated measured net capital outflows amounted to EUR 1.6 trillion. Meanwhile the net international assets rose from about EUR 0.1 trillion to just over EUR 1 trillion. What happened to the stock-flow gap of EUR 0.4-EUR 0.6 trillion, around 20% of GDP?

Fratzscher (2013) ascribes the discrepancy to "bad investments abroad", Meyer and Jaeger (2013) refer to "wasted … investments", Gros (2013) alludes to "wasted resources", and the European Commission (2012a, pp. 39-42) highlights losses on US subprime mortgages. However, it may well be that exchange rate valuation effects, broad price effects and reporting system factors are as

[10] Habib (2010) notes that in his earlier sample period, there is little stock-flow discrepancy for Germany. European Commission (2012a) finds little gap through 2006.

Figure 2.18: Cumulated balance of payments and international investment position



Cumulated flows and net international asset stocks in trillions of domestic currency
Sources: Lane and Milesi-Ferretti (2007); CEIC; Datastream; national data.

important as credit losses in accounting for the gap. If nowadays over a quarter of assets but only an eighth of liabilities are in foreign currency,[11] then the decline of the dollar since 2002 could have held down net assets by EUR 100 billion. Price effects arise from the stronger performance of German bonds (and stocks) on the liability side compared to that of bonds (and stocks) from the rest of the euro area. In particular, the widening of intra-European sovereign bond spreads, with German bunds serving as the safe haven, widened the stock-flow discrepancy. European Commission (2012a) reports EUR 105 billion valuation gains on German liabilities alone in 2007-2011. Cœuré (2013) refers to Germany playing the role in the euro area ascribed to the United States for the world by Gourinchas and Rey (2007) and Gourinchas *et al.* (2010), that is, providing insurance by delivering mark-to-market gains in bad states of the world.[12]

To be sure, German investors have experienced credit losses on German investments in US asset-backed securities and in some peripheral euro area bonds. Table 2.1 shows USD 42 billion of investments in US private label asset-backed securities on the eve of the crisis in June 2007, but the total could easily be two or three times that amount when account is taken of bonds booked by German banks in the UK, Ireland and the United States.[13] (A subsequent rebooking of assets at head office may account for the otherwise odd rise in (unconsolidated) Landesbanken claims on foreign nonbanks in late 2008; see Annex Figure 2.A1 and IMF (2011c).) Table 2.1 shows that China (like Japan with its large official

[11] Deutsche Bundesbank (2008) reported that at end-2007, 32% of external assets and 16.5% of external liabilities were denominated in foreign currency, down from 46% and 21% at end-1998.

[12] Although the European Commission (2012a, p. 42, Graph 2.12) puzzlingly shows valuation gains by Germany vis-à-vis the "vulnerable" members of the euro area in 2007-2010.

[13] See Bertaut *et al.* (2011) and Bernanke *et al.* (2011). That banks can lose on assets booked in the United States is evident from UBS (2008).

foreign exchange reserves) had little exposure to what became known as toxic assets. On Table 2.1, penultimate line, only 5% of China's asset-backed securities were private label, rather than government-sponsored agency, in contrast to the high German (or European) fractions (although these numbers would not capture Chinese bank holdings in Hong Kong). Similarly, such securities represented just 1% of Chinese bond holdings in the United States but fully 27% of German bond holdings.

Table 2.1: Concentration of US bond holdings in private-label asset-backed securities – By residence of investor, in billions of US dollars, June 2007

	CN	DE	CH	FR	IE	JP	NL	UK
Private mortgage-backed securities (MBS)	9	33	20	31	33	17	32	90
Other private ABS	2	10	14	4	23	13	12	52
Total corporate ABS	11	42	34	35	56	30	44	142
Corporate bonds	28	98	89	58	136	119	84	406
Agency MBS	206	8	6	1	20	103	20	18
Total US bonds	870	155	140	84	176	901	123	476
Memo: Corporate ABS share, %								
Corporate bonds	*32.1*	*33.7*	*22.5*	*53.4*	*24.3*	*14.3*	*38.1*	*22.2*
Total ABS, incl. agency MBS	*5.1*	*84.0*	*85.0*	*97.2*	*73.7*	*22.6*	*68.8*	*88.8*
Total US bonds	*1.3*	*27.1*	*24.3*	*41.7*	*31.8*	*3.3*	*35.8*	*29.8*

CN = China; DE = Germany; CH = Switzerland; FR = France; IE = Ireland; JP = Japan; NL = Netherlands; UK = United Kingdom.
Source: US Treasury, Federal Reserve Bank of New York and Board of Governors of the Federal Reserve System, *Report of foreign portfolio holdings of US securities as of June 30, 2007*, April 2008, Tables 23 and 24.

With regard to German investments in the periphery of Europe, there is a question whether there was a regional bias in German investment after the euro. While the Deutsche Bundesbank (2008) found that the weight of German external assets in the euro area rose from 39% in 1999 to 50% in 2007, BIS consolidated bank data (including banks' holdings of bonds) show no rise in the weight on the euro area (see Annex Figure 2.A2). On this view, German foreign investment was drawn to rapidly growing stocks of credit, whether US and Spanish mortgage bonds or interbank lending and sovereign bonds in the euro area: more banking glut (Shin, 2012) than euro bias.

For China, there is no question where the concentration of exposure lies. According to the most recent joint Treasury/Federal Reserve survey, Chinese assets in the United States amounted to USD 1.6 trillion at end-June 2012, about a third of China's external assets then. Thus, it may be (even taking into account German bank exposures booked outside of Germany) that the concentration of China's external assets in the United States is lower than the concentration of Germany's

external assets in the euro area before the global financial crisis. China's external assets are nevertheless concentrated, reflecting the historical anchoring of the renminbi to the US dollar, but this concentration is not backstopped by parallel monetary or political structures of integration.

2.5. POLICY SETTING AND CONCLUSION

It is useful to summarise the policy context for the conclusions of this chapter. That policy has parallel and mutually informing global and European tracks.

In Gyeongju, Korea in late October 2010, finance ministers and central bank governors of the G20 countries considered a proposal that would have presumed that economies running a surplus in excess of 4% needed to take action to narrow such surpluses. In the event, the proposal was not adopted. Instead, the G20 agreed to draw up "indicators and indicative guidelines" that would allow the IMF to identify and to analyse economies with "large and persistent" current account imbalances. This compromise projected onto the world indicators and procedures under development in Europe (see Deutsche Bundesbank (2011) and below).

After the G20 negotiated the "indicators and indicative guidelines", the IMF produced sustainability reports in November 2011 during the French presidency of the G20. These covered the United States, Japan, China, Germany, France, the UK, India and later the euro area as a whole (addressing intra-area imbalances). These reports supported a mutual assessment process (MAP) within the G20 process.

The sustainability reports for China and Germany sharply distinguished the role of policy in the two surpluses. "External surpluses in Germany do not primarily reflect market failures or policy induced distortions", wrote the IMF (2011a). Rather, sensible domestic reforms had this as a side-effect, given the choices of German households and firms and outcomes in the foreign exchange market. In the case of China, the IMF staff (2011b) cited policy-induced distortions, including financial repression and exchange rate undervaluation, in explaining high savings in the household, corporate and government sectors. The IMF staff forecast the German current account surplus narrowing from around 5% to 4% of GDP. In the case of China, the IMF staff foresaw the current account widening again to 8% of GDP as investment faded over the medium term (albeit on the assumption of a stable real effective exchange rate — see Graph 9, right-hand panel), while the Chinese authorities foresaw the surplus remaining below 5% of GDP. At writing, the IMF staff update of these reports for the Russian presidency of the G20 is awaited.

In Europe, Giavazzi and Spaventa (2011) rejected the sanguine view of euro area current account deficits of Blanchard and Giavazzi (2002). In Brussels, negotiations resulted in asymmetric indicators for current account imbalances. Current account deficits in excess of 4% of GDP (as in Gyeongju) or current account surpluses in excess of 6% of GDP were set as "thresholds", defined in terms of three-year backward moving averages. As in the G20 mutual assessment process, the macroeconomic imbalance procedure (MIP) in Europe places these current account thresholds among other indicators (European Commission, 2012b).

That said, the latest data posted on the "imbalance scorecard" of Eurostat show that the three-year moving average of the German current account surplus as a share of GDP (one of 11 indicators) exceeds 6%. This could lead to the European Commission's next Alert Mechanism Report focusing on the German current account surplus. With the rest of the euro area in current account balance (Figure 2.1), it might seem that Germany's surplus has emerged as more a global surplus than a euro area surplus. However, Germany registers about half her current account surplus vis-à-vis the rest of the euro area. In principle the European Commission process can press for adjustment by a surplus country, using reverse qualified majority voting, and bringing to bear sanctions of non-interest bearing deposits and even fines.

This policy setting puts our comparisons and contrasts of China and Germany as surplus and creditor countries in perspective. Their current accounts give rise to comparisons more than contrasts; their creditor positions to contrasts more than comparisons.

In both cases, sensible policy reform tended to produce an expanded labour force and stable wages, shifting the distribution of income towards profits. In both cases, corporate savings rose as a share of GDP, with the domestic investment (and private consumption) response to the higher profits weaker in Germany. In both cases, this widened the current account surplus, which has proven more persistent in the case of Germany.

That said, we have also drawn contrasts in the current accounts. Germany's surplus has surpassed that of the larger Chinese economy, and is three times larger in relation to GDP. The narrowing of the current account of China has benefited from strong real effective exchange rate appreciation, whereas the persistence of Germany's current account surplus is consistent with its, until recently, stable or even depreciating real effective exchange rate. It is an irony of this contrast that the much-criticised renmimbi management has produced an adjustment in the direction that serves to narrow China's current account surplus, while the renminbi free-floating euro has interacted with domestic cost trends to maintain Germany's competitiveness.

As creditor countries, the contrasts are more striking. Germany's net international creditor position continues to rise in relation to GDP, while that of China has backed off, and in dollar terms that of Germany is closing in on that of China. The short-equity, long-debt profile of China's external position buys China insurance against idiosyncratic and global risks at the cost of net investment payments. By contrast, Germany sells insurance to the rest of the world, and to the rest of the euro area in particular, and harvests moderate income in doing so. Consistent with the greater role of the Chinese government in the economy, Germany's government plays a much smaller role as a holder of the claims on the rest of the world than the Chinese public sector. The potential for Chinese policy rebalancing in this regard is clear.

That said, we have also drawn comparisons of the two creditor economies. We have shown that the former gap between the roles of the two governments in holding each economy's foreign assets has narrowed as an unintended consequence of the structure of the Eurosystem and the management of the euro area crisis. We have shown that a discrepancy has opened up between the cumulated current account flows and the net international investment position stocks. These seem to be related to exchange-rate losses in both cases, and outperformance of German ("safe haven") bonds and equities and price or credit losses on claims on US mortgage borrowers and European peripheral borrowers.

However one looks at it, it is hard to escape the conclusion that the workings of the international monetary system allows big countries to run big surpluses. We come back to Aliber's version of Triffin, in which the US economy provides global consistency as the N-1 economy.

References

AIZENMANN, J. and SENGUPTA, R., 2011, "Global imbalances: Is Germany the new China: A skeptical view", *Open Economies Review*, vol. 22, no. 3 (July), pp. 387-400.

BERNANKE, B., BERTAUT, C., DEMARCO, L.P. and KAMIN, S., 2011, "International capital flows and the returns to safe assets in the United States, 2003-2007", Board of Governors of the Federal Reserve System *International Finance Discussion Papers* Number 1014, February.

BERTAUT, C., DEMARCO, L.P., KAMIN, S., and TRYON, R., 2011, "ABS inflows to the United States and the global financial crisis." Board of Governors of the Federal Reserve System, *International Finance Discussion Papers* Number 1028.

BIBOW, J., 2012, "The euro debt crisis and Germany's euro trilemma", Levy Economics Institute of Bard College *Working Paper* No. 721, May.

BIBOW, J., 2007, "Global imbalances, Bretton Woods II, and Euroland's role in all this" in BIBOW, J. and TERZI, A. (Eds.), *Europe and the world economy: Global player or global drag?*, Basingstoke, Palgrave Macmillan, pp. 15-42.

BLANCHARD, O. and GIAVAZZI, F., 2002, "Current account deficits in the euro area: the end of Feldstein-Horioka puzzle?", *Brooking Papers on Economic Activity*, Vol. 2002, No. 1, pp. 1-49.

BORIO, C. and DISYATAT, P., 2011, "Global imbalances and the financial crisis: Link or no link?" BIS *Working Papers* No. 346, May.

CECCHETTI, S., MCCAULEY, R. and MCGUIRE, P., 2012, "Interpreting TARGET2 balances", BIS *Working Papers,* No. 393, December.

CHINA DEVELOPMENT BANK (CDB): CDB Annual Reports, various years.

CHINA EXPORT AND IMPORT BANK (China EXIM Bank): *China EXIM Bank Annual Report*, various years.

CHINA INVESTMENT CORPORATION (CIC): *CIC Annual Report*, various years.

CŒURÉ, B., 2013, *Global liquidity and international risk-sharing in the post-crisis environment*, speech at the Bank of Korea International Conference 2013 "Assessing Global Liquidity in a Global Framework", Seoul, 3 June 2013.

CURCURU, S.E., THOMAS, C.P. and WARNOCK, F.E., 2013, "On returns differentials", *Journal of International Money and Finance*, forthcoming, doi: 10.1016/j.jimonfin.2013.02.002.

DEUTSCHE BUNDESBANK, 2008, "Germany's international investment position since the beginning of monetary union: developments and structure", Deutsche Bundesbank *Monthly Report*, October, pp. 15-32.

DEUTSCHE BUNDESBANK, 2011, "Germany's external position against the background of increasing economic policy surveillance", Deutsche Bundesbank *Monthly Report*, October, pp. 41-59.

EUROPEAN COMMISSION, 2012a: *Current account surpluses in the EU, European Economy 9/2012,*

EUROPEAN COMMISSION, 2012b: *Quarterly Report on the Euro Area*, Volume 11, no. 1.

FLASSBECK, H., 2007, "Wage divergence in Euroland: Explosive in the making" in J. BIBOW and A. TERZI (Eds.), *Europe and the world economy: Global player or global drag?* Basingstoke: Palgrave Macmillan, pp. 43-52.

FRATZSCHER, M., 2013, "10 statements – Investment for more growth: An agenda for Germany's future", *BerlinOeconomos*, 26 June, 2013 https://berlinoeconomicus.diw.de/en/

GIAVAZZI, F. and SPAVENTA, L., 2011, "Why the current account matters in a currency union: Lessons from strains in the euro area" in M. BEBLAVÝ, D. COBHAM and L. ÓDOR (Eds.), *The euro area and the financial crisis*, Cambridge, Cambridge University Press, pp. 199-221.

GOURINCHAS, P.-O. and REY, H., 2007, "From world banker to world venture capitalist: U.S. external adjustment and the exorbitant privilege" in R. CLARIDA (Ed.), *G-7 Current Account Imbalances: Sustainability and Adjustment*, Chicago, University of Chicago Press, pp. 11-55.

GOURINCHAS, P.-O., REY, H. and GOVILLOT, N., 2010, "Exorbitant privilege and exorbitant duty", mimeo.

GROS, D., 2013, "The world economy according to an excess savings country" in *Think Tank 20: The G-20 and central banks in the new world of unconventional monetary policy*, Washington, Brookings, pp. 38-40.

GROS, D. and MAYER, T., 2012, "A sovereign wealth fund to lift Germany's curse of excess savings, *CEPS Policy Brief,* No. 280, 28 August.

HABIB, M.M., 2010, "Excess returns on net foreign assets – the exorbitant privilege from a global perspective", European Central Bank *Working Paper Series* 1158.

HALLETT, A. and MARTINEZ Oliva, J.C., 2013, "The importance of trade and capital imbalances in the European debt crisis", *Peterson Institute for International Economics Working Paper Series*, no WP 13-01, January.

HÜFNER, F. and KLEIN, C., 2012, "The German labour market: Preparing for the future", OECD Economics Department *Working Papers*, No. 983, OECD, September.

INTERNATIONAL MONETARY FUND, 2011a, *Germany: Sustainability Report.*

INTERNATIONAL MONETARY FUND, 2011b, *People's Republic of China: Sustainability Report.*

INTERNATIONAL MONETARY FUND, 2011c, *Staff Report for the 2011 Article IV Consultation with Germany*, 9 June.

KINDLEBERGER, C., 1965, "Balance-of-payments deficits and the international market for liquidity", *Princeton Essays in International Finance*, No. 46, May.

KINDLEBERGER, C., 1967, *Europe's postwar growth: The role of labor supply.* Cambridge, Harvard.

KINDLEBERGER, C. and ALIBER, R.Z., 2005, *Manias, panics and crashes, 5th edition.* New York, Wiley.

LANE, P. and MILESI-FERRETTI, G., 2003, "International financial integration", *IMF Staff Papers*, vol. 50, Special Issue, International Monetary Fund, Washington, DC, pp. 82-113.

LANE, P. and MILESI-FERRETTI, G., 2007, "The external wealth of nations mark II: revised and extended estimates of foreign assets and liabilities, 1970–2004", *Journal of International Economics*, vol. 73, November, pp 223-250.

LANE, P. and SCHMUKLER, S., 2007, "International financial integration of China and India", in A Winters and S Yusuf (eds.), *Dancing with giants: China, India, and the global economy*, The World Bank and The Institute of Policy Studies, pp. 101-132.

LASTER, D. and MCCAULEY, R., 1994, "Making sense of the profits of foreign firms in the United States", *Federal Reserve Bank of New York Quarterly Review* (Summer-Fall), pp. 44-75.

MA, G. and MCCAULEY, R., 2013, "Is China or India financially more open?", *Journal of International Money and Finance*, forthcoming, http://dx.doi.org/10.1016/j.jimonfin.2013.06.017.

MA, G., MCCAULEY, R. and LAM, L., 2013, "The roles of saving, investment and the renminbi in rebalancing the Chinese economy", *Review of International Economics*, Vol. 21, No. 1, pp. 72-84.

MA, G. and WANG, Y., 2010, "China's high saving rate: myth and reality", *International Economics*, No. 122, pp. 5-40.

MA, G. and ZHOU, H., 2009, "China's evolving external wealth and rising creditor position", BIS *Working Papers* No. 286, July.

MEYER, T., and JAEGER, M., 2013, "EMU's reluctant banker", Deutsche Bank Markets Research *Global economic perspectives*, 24 July 2013, pp. 3-11.

OBSTFELD, M., 2012, "Does the current account still matter?" *American Economic Review,* vol 102, no 3 (May), pp 1-22.

POSEN, A., 2013, "Getting Germany past internal devaluation" *Die Welt,* 9 June, translated by Peterson Institute of International Economics.

SALANT, S. and HENDERSON, D., 1978, "Market anticipations of government policies and the price of gold", *Journal of Political Economy*, vol. 86, no. 4 (August), pp. 627-648.

SHIN, H., 2012, "Global banking glut and loan risk premium", *IMF Economic Review*, vol. 60, July, pp. 155-192.

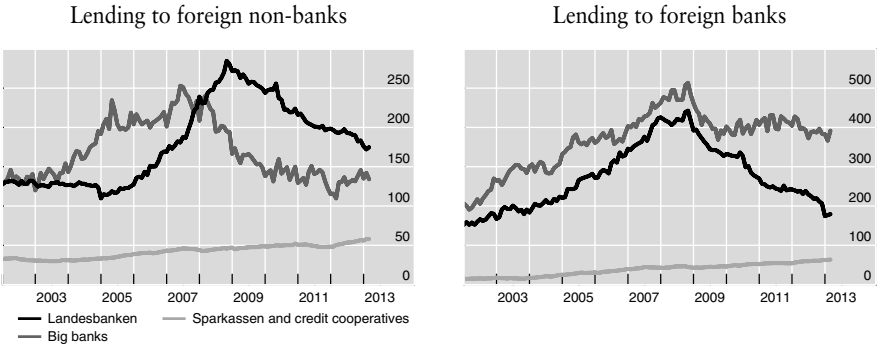
TRIFFIN, R., 1960, *Gold and the dollar crisis*, Yale University Press, New Haven.

UBS, 2008, *Shareholder report on UBS's write-downs*, 18 April.

ZHANG, Z., 2009, "Dark matters in China's current account", draft.

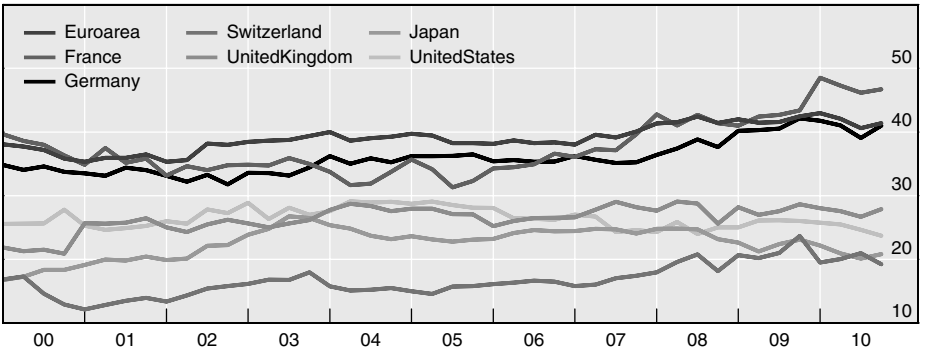
ANNEX: GERMAN BANK FOREIGN ASSETS

Figure 2.A1: German banks' foreign lending by category of banks (in EUR bn)



Sources: Deutsche Bundesbank.

Figure 2.A2: Foreign claims on the euro area as a share total foreign claims[1] (by bank nationality in %)



[1] Foreign claims consist of cross-border claims and local claims of foreign affiliates.

Source: BIS consolidated banking statistics

3. Is Monetary Policy a Science? The Interaction of Theory and Practice over the Last 50 Years

William R White

"In theory, there is no difference between theory and practice.
In practice, there is."
Yogi Berra

3.1. Introduction

It has become fashionable to talk about the "science" of monetary policy[1]. This assertion must imply that there is a well-accepted theory about how monetary policy should be conducted. Moreover, it must also assume that this theory has been confronted with the facts and has been found universally useful by policy makers. Indeed, the joint use of inductive and deductive logic is at the core of the scientific method and the very definition of science[2].

In this paper, it is rather contended that the practice of monetary policy is far from a science. It has evolved continuously for the last fifty years, and is still in the process of change. At least five phases[3] can be roughly distinguished: Bretton Woods (1946 to 1972), Monetarism (1972 to 1982), Inflation Control (1982 to 1992), Inflation Targeting (1992 to 2007), and finally, The Response to the Crisis (2007 to 2013). Moreover, unlike science, where knowledge accumulates incrementally about eternal realities, these phase changes in monetary policy have occurred in response to both changed circumstances (economic structure) and sometimes the mere fashion of beliefs (economic theory).

An important factor conditioning the changing conduct of monetary policy has been continuous change in the *structure* of the economy itself. Both the real and financial sectors have evolved under the influence of new technology and the general trend (since the 1960s) towards deregulation and liberalization. While international trade had been rising steadily since the end of World War II, the entry of previously planned economies into global markets (dating from the late 1980s) was a particularly important event. More generally, the importance of the

1 See Clarida *et al.* (1999), Mishkin (2009) and Mishkin (2011) for examples.
2 Hayek (1979) and Popper (1972).
3 These distinctions are more or less consistent with those drawn in earlier surveys of the conduct of monetary policy by Bordo (2008), Goodhart (2010) and Laidler (2007).

Advanced Market Economies (AMEs) in the global economy has been increasingly complemented by the growth of the Emerging Market Economies (EMEs). Financial markets have also evolved. Initially, financial systems were largely limited by national borders, were bank dominated, and characterized by a high degree of cartelization and associated stability. Over the years, however, this financial structure changed into one much more characterized by globalization, securitization ("shadow banking" and market based intermediation) and a highly significant degree of consolidation[4].

Significant changes in "accepted" economic theory have also occurred over the last fifty years. Academic theorists played a significant role in this evolution, with the contributions of Milton Friedman being of seminal importance. Two general trends characterized the theoretical literature over the pre-crisis period. First, it became increasingly accepted that the economy was inherently self-stabilizing, and that discretionary policies were either useless or harmful. In this regard, the academics drew more from Hayek than from Keynes. Second, the role played by expectations, and particularly inflationary expectations, took on increasing importance. Indeed, the idea advanced by Friedman and Phelps[5], that changing inflationary expectations meant there was no long run trade-off between inflation and output, was arguably the most influential theoretical insight of the post war period. Arguments put forward by Friedman also played a big role in legitimizing the shift towards floating exchange rates after the breakdown of the Bretton Woods regime.

To some degree, theoreticians were responding to the changing structure of the economy. In effect, there was a positive feedback loop between theory and practice. As the economic benefits of liberalization became increasingly evident, they demanded rationalization in terms of theory. As well, however, there was a certain influence of political ideology, not least the merits of free markets and the related belief that government interference in markets would eventually prove a threat to democracy itself[6]. Finally, theoreticians also responded to the changing nature of the problem being faced by policymakers; focusing in earlier decades on unemployment, but from the 1970s onwards on how to control inflation[7].

Against this backdrop of change in economic structure and theory, the practice of monetary policy also changed enormously. Not surprisingly, there was also a general trend over the last 50 years for central banks to rely more on the operations of free markets (increasingly assumed to be self-stabilizing and "efficient") and to focus more on the management of inflationary expectations and less on trying to fine tune the economy. However, while central bank practices prior to the crisis

4 See Adrian and Shin (2010), Gorton and Metrick (2010) and Bank for International Settlements (2010).
5 Friedman (1968) and Phelps (1968).
6 Again the influence of Hayek can be identified. In particular, see Hayek (1944).
7 See the references in Laidler (2009).

were strongly influenced by trends in theory, they responded pragmatically to other influences as well. Not least, central banks changed their practices when evidence emerged that previously held theories were simply inconsistent with the facts or that previous practices had unforeseen and unwelcome consequences[8].

Central banking practice and monetary theory have also diverged over the last fifty years because the real world is infinitely more complex and constraining than any theoretical model can be. First, central banks must choose a strategy for conducting policy which shows a certain consistency over time. In this context, regime choices, particularly with respect to exchange rates, take on great importance. Second, central bankers operate within an analytical, political and philosophical framework, with many practical aspects of these frameworks not subject to any guidance from monetary theory. Third, conditional on the exchange rate regime and the chosen monetary framework, policy makers must also make certain operational decisions which allow them to exploit whatever room for manoeuvre remains in pursuing their objectives. However, theory provides no unambiguous guidance about how best to deal with such issues as errors in estimating output "gaps" or how best to choose among alternative operating instruments.

The principal objective of this paper is to show how these exchange rate choices, monetary policy frame works, and operational procedures have evolved over the last fifty years – and why. A further point of interest will be to evaluate how the current crisis might also lead to changes in each of these aspects of monetary policy going forward. In the process, we might also get some insights as to why thoughtful people might reasonably disagree on how best to conduct monetary policy. And, as a corollary, we might also understand better why an approach to monetary policy that might seem good for one country might not be seen as equally good for another.

3.2. THE CHOICE OF AN EXCHANGE RATE REGIME

It seems generally agreed that a monetary authority needs some kind of a strategy to ensure the consistent conduct of policy over time. When considering such a strategy, the choice of an exchange rate regime figures very highly. The underlying reality is that of the "Impossible Trinity". A country cannot simultaneously have free capital flows, a fixed exchange rate and an "autonomous" monetary policy[9].

[8] This conclusion is also reached by Laidler (2007), Goodhart (2010) and Cagliarini *et al*. (2010) In particular, they all agree that both theorists and practitioners refocused their attention on inflation, after the beginning of the Great Inflation of the 1970s.

[9] The word "autonomous" is used here to convey the idea that a state or currency area can have a monetary policy stance that differs from other states or currency areas. This is a different concept from the "independence" of central banks, which relates to the capacity to conduct domestic monetary policy free from the day to day influence of other domestic bodies.

While this phrase was made famous by Mundell (1963) and Fleming (1962) in the 1960s, it formed the backdrop for the Bullionist – Currency Debate in the UK going as far back as the 19th century[10]. What has changed over time, however, has been the weight given to the arguments for retaining (or omitting) each of the three elements. Moreover, at various times, countries have run into serious difficulties through trying to achieve simultaneously more of the three objectives than was practically possible.

The most enduring of fixed exchange rate regimes was the *Gold standard*, which dominated the scene prior to World War I and was temporarily reimposed in many countries afterwards. During that period, the desirability of internationally mobile capital and a fixed exchange rate against gold went essentially unchallenged. The advantages were said to include the long run stability of domestic prices, an efficient international allocation of capital, transparency and simplicity. The loss of monetary autonomy (discretion was largely replaced by a rule) was actually welcomed, as domestic authorities were generally not trusted to pursue price stability. The legacy of this heritage can be seen in modern currency boards[11] and above all in the establishment of the euro zone[12].

The *Bretton Woods system* gave priority to fixed (but adjustable) exchange rates and to the autonomous conduct of domestic monetary policy. The desire for fixed exchange rates reflected the belief that fixed rates were necessary for the continued expansion of world trade, while monetary policy was thought to have considerable countercyclical potential. The price to be paid involved acceptance of the many impediments to free capital flows that had built up over the years. However, the Bretton Woods system eventually broke down as capital flows increased in volume and the problems associated with the Impossible Trinity became more pressing. The fact that the United States (at the centre of the system) was pursuing an aggressively expansionary monetary policy, in spite of rising domestic inflation[13], also proved increasingly uncomfortable for those pegged to the dollar. As inflation began to rise almost everywhere, the pressure to cut the link with the dollar eventually proved insurmountable[14].

[10] See Bordo (2008), p. 718.

[11] For a discussion of the workings and successes of some modern currency boards, see Ghosh *et al.* (2000) as well as Hanke and Schuler (1994).

[12] For some years there have also been ongoing discussions of possible currency unions in the Gulf and in Southern Africa. These discussions have not yet lead to concrete actions, not least because of concerns about some of the economic disadvantages of such relationships. A further political factor has been concern about the dominant influence of single countries at the centre of each of these proposed currency unions.

[13] There were arguably two reasons for the failure of monetary policy to resist rising US inflation. First, it was widely believed at the time that inflation was a cost – push phenomenon against which monetary policy could do nothing. Second, the Chairman of the Federal Reserve (Arthur Burns) was under strong pressure from the Nixon Administration (which had appointed him from among their own ranks) to contribute to Nixon's reelection by keeping policy rates down. For different interpretations of these events, see Meltzer (2009a and 2009b) and Nelson (2012).

[14] For a gripping account of this period see Silber (2012).

Prior to the breakdown of the Bretton Woods system, a growing theoretical literature[15] had supported the view that this was actually a good thing. Not only did a *floating exchange rate regime* allow a nationally determined monetary policy, but it was in theory a desirable response to asymmetric shocks between countries. The danger that the float might be unstable, leading to costly resource misallocations, was refuted by the generally accepted doctrine of Uncovered Interest Parity (UIP). Moreover, after the breakdown of the Bretton Woods system, trade continued to expand rapidly and trade barriers continued to decline, indicating that fixed rates were not necessary to promote these ends. The positive aspects of international capital flows were also stressed, along with the merits of an autonomous monetary policy. Indeed, in the late 1990s the IMF began lobbying strongly in favour of changes to Article 8 of the IMF Articles to make capital account liberalization compulsory[16].

However, as practical experience with floating grew, the conflicts inherent in the Impossible Trinity also became still more evident. The weakness of the dollar in the late 1970s compounded inflationary problems in the US. The subsequent appreciation of the dollar in the mid-1980s was so strong that it was deemed by the G5 (later the G7) to be unacceptable, and led to the Plaza Accord. The subsequent depreciation was then so strong that it led to the Louvre Accord to stabilize exchange rates once more[17]. These international Accords were given priority over domestic objectives; much like Bretton Woods had done earlier, but led in turn to some highly undesirable consequences. In particular, as efforts were made to lower the value of the Yen and support the dollar, as agreed in the Louvre Accord, Japanese monetary policy was kept very accommodative. While this did not lead to a sharp increase in inflation, as many expected, it did contribute materially to the Japanese credit, asset price and investment "boom" which turned to "bust" in the early 1990s.

Other crises in the 1990s also attest to some of the problems posed for policymakers by highly volatile capital flows, both inflows and outflows. As capital inflows increased around the middle of the 1990s, a number of Asian countries also used easy monetary policy to resist the upward pressure on their exchange rates. As in the earlier Japanese case, this led to many internal (credit driven) imbalances which again culminated in a deep crisis and recession. In contrast, buoyed by positive structural developments in the early 1990s, a tightening monetary policy in Mexico led to capital inflows which sharply increased the value of the peso. Then, as the country's external balance began to

[15] See in particular Friedman (1953).

[16] In addition to noting the advantages for the international allocation of capital, the Fund also stressed the disadvantages of capital controls. They noted that controls became more porous with time, that they were subject to abuse and invited corruption, and could have perverse effects of various sorts.

[17] See Funibashi (1988).

deteriorate, the peso fell even more rapidly than it had risen and a deep recession followed. Taken together, these experiences indicated that both floating and fixing have their associated dangers.

The European Monetary System (EMS) established by the European Council in November 1978, and launched in March 1979, was another attempt to fix exchange rates which was eventually undermined by free capital flows. It too ended in crisis in the early 1990s, with a number of countries (UK, Italy, the Nordics) being forced out of the exchange rate mechanism. In this case, the problem was not one of major inflows, followed by subsequent outflows. Rather, doubts grew as to the sustainability of the chosen exchange rates and speculation followed. In the UK, monetary policy resistance was muted given the fear (both political and economic) of the effects of a sharp increase in predominantly variable rate mortgages. In Sweden, the policy rate was raised to over 500 per cent (annualized), but this was thought "unsustainable" and failed to restore confidence. Not least, such high interest rates threatened to raise government debt service requirements at a time when the government deficit was already uncomfortably high.

These recurring exchange rate crises led to a *fundamental rethink* of how to deal with the Impossible Trinity problem. The need for a rethink was further indicated by a number of studies indicating that Uncovered Interest Parity did not hold in practice, except over very long time periods[18]. This implied that free capital flows could cause floating exchange rates to move a very long way from "equilibrium" levels with significant implications for resource misallocations. The rethink, however, led different countries to come to sharply different conclusions.

In the AMEs, with their much longer history of liberalized financial markets, there was a widely held belief that only corner solutions (more fixed or more floating) would prove a viable response to the problem of capital flows[19]. As a result, it was concluded that floating among the larger AMEs had to be much more vigorously embraced. In effect, "fixing" was given up, and there have in fact been very few attempts to interfere with (much less to target) exchange rate movements in recent years[20].

In contrast, but still in keeping with the belief in corner solutions, the decision was taken within Europe to introduce the euro and to establish the euro zone. This was given legal substance by the Maastricht Treaty of 1992. In effect, "national monetary policy" was given up by the member countries in the hope of

[18] See Berk *et al.* (2001). Also Murray and Khemani (1989).
[19] Fischer (2001) was a vocal critic of this view.
[20] However, statements made early in 2013 by the incoming Japanese Prime Minister on the need to weaken the yen, and subsequent statements by the President of France on the need to weaken the euro, could indicate this phase of "benign neglect" might be coming to an end.

achieving other economic and political[21] benefits. Not least, the single currency was expected to give impetus to the establishment of a single European market. Moreover, there would be a flow of capital from high saving countries (with low rates of return on capital) to countries with low saving rates (and high rates of return on capital). Price stability would be assured through the establishment of an "independent" European Central Bank with price stability as its core mandate. Fiscal discipline was thought to be ensured by provisions of the Maastricht Treaty which set limits for the size of deficits and the stock of sovereign debt.

While many of the institutional changes promoted in the Maastricht Treaty of 1992 were recognized as being inadequate, there was a strong sentiment from the beginning that any shortcomings would be more than matched by future institutional change. James (2012) notes that many of the participants in the discussions leading up to the establishment of the euro zone saw clearly that, if the Eurozone were to survive, it would eventually require fiscal, banking, economic and, above all, political union.

Whereas the AMEs satisfied the Impossible Trinity by dropping one of the three elements, the recent trend in EMEs has been to accept "constrained" versions of all three to cope with persistent upward trends in their exchange rates. This choice might reflect the fact that their financial sectors have continued to be highly regulated by AME standards. Thus, many countries have combined a managed float (with heavy foreign exchange intervention and reserve accumulation) with managed capital flows (encouraging FDI and discouraging "hot money")[22] and with a form of constrained monetary policy (relying less on policy rate increases and more on higher reserve requirements)[23].

Concerns about higher policy rates attracting harmful capital inflows, and an unwelcome appreciation of the exchange rate, have also contributed to EMEs showing a greater interest in recent years in the use of macro prudential instruments[24]. Such interest was already increasing in both AMEs and EMEs[25] given the presumed usefulness of macro prudential instruments in the pursuit of financial stability.

[21] James (2012) casts doubt on the hypothesis that the motivation for the euro zone was primarily political, designed to link France and Germany so tightly that war would be inconceivable. That is not to deny that many saw this as a welcome side effect.

[22] Along with administrative measures to manage capital inflows, many EMEs have taken measures to reduce the harm caused by volatile inflows and outflows. For example, regulatory measures can be taken to limit currency mismatch problems on the balance sheets of financial institutions.

[23] Turkey is an extreme example of this. In 2011, as administrative controls were tightened over domestic credit, policy rates were lowered to reduce the inflow of foreign capital. Innovative measures were also taken to drive a wedge between deposit rates (lower) and loan rates (higher).

[24] See Galati and Moesner (2011) and CGFS (2012) for a list of such measures, an assessment of their effectiveness, and how they might be best used in practice.

[25] See Borio and Shim (2007) and International Monetary Fund (2013).

Looking forward in light of the global crisis, it would not be surprising if all countries (but particularly EMEs) were to start putting increased reliance on capital controls to help resolve the problems posed by the Impossible Trinity. The failure of UIP to hold, except in the long run, constitutes a market failure that might seem positively to invite an administrative response. Further, the ultra-easy monetary policies pursued by the largest currency blocks, since the onset of the crisis, have already elicited fears of "currency wars" between the AMEs and EMEs. This could provide moral cover for recourse to the use of instruments previously thought inappropriate. Further, recent concerns about "competitive devaluations" within the AME group imply that this danger is growing[26]. Finally, Reinhart and Sbrancia (2011) have noted that the growing incapacity of AME governments to service their sovereign debts could easily lead to financial repression; some combination of continued low interest rates, inflation and forced holdings of government debt through administrative means. In effect, it might eventually prove expedient for AMEs to prevent capital outflows and for EMEs to prevent capital inflows[27].

Future policies within the Eurozone will reflect not only the global crisis, but the crisis that emerged in its wake in the Eurozone itself. Both crises had their roots in the same phenomenon, a build-up of debt by borrowers that eventually proved unsustainable and threatened as well the survival of those (especially financial institutions) that had made the imprudent loans in the first place. Within the Eurozone, this manifested itself as a "sudden stop" of private capital flows to the peripheral Eurozone countries, later reinforced by regulatory influence in creditor countries. The shorter term Eurozone challenge is to ensure adequate financing for debtor countries, preferably (but not necessarily) by renewed inflows of private funds. In this regard, it is crucial that the longer run integrity of the Eurozone itself becomes unquestionable. This will require steady progress towards the fiscal, banking, economic and political union referred to above. A longer term Eurozone challenge will be to restore the relative competitiveness of the peripheral countries. Not least, this will require that future capital inflows are used for more productive purposes than they were in the past. If these challenges are not met, the Eurozone could disintegrate as have many monetary unions before.

A greater use of capital controls at the global level might also trigger a broader re-evaluation of *global exchange rate arrangements*. The fact that the current

[26] The Swiss National Bank took extreme measures to prevent the Swiss franc from rising above a level of 1.20 Swiss francs to the Euro. The new Abe government in Japan has also taken some extreme measures to reflate the economy which has had the effect of sharply lowering the value of the yen against the dollar.

[27] At the global level, the IMF (2012) has recently agreed that capital controls can be useful (albeit, in extremis) and that countries that are the source of capital flows have some responsibility for the macroeconomic implications for host countries. Both these rulings would lend support to a wider use of capital controls in both EMEs (inflows) and AMEs (outflows).

crisis has had implications for virtually all major countries intuitively supports the search for a common global source for these problems. As described above, we currently have a "non system" in which AMEs and EMEs can react in markedly different ways to movements in their exchange rates[28]. Moreover, the growing importance of EMEs in the global economy implies that their exchange rate choices now have serious implications for others. Whether EMEs hold down their exchange rates through easy money or through intervention, their actions contribute to higher inflation and other imbalances, both domestically and in the AMEs as well[29]. Note too that there are no technical limits on the capacity of countries to print money to hold down their exchange rate. This implies that the potential for damaging side effects could be very large indeed.

To be even more speculative, if the end result of the current exchange rate "non system" is continuing crisis, even the merits of *autonomous national monetary policies* could be questioned. A recent study group, composed of both academics and central bank practitioners[30] has explicitly stated the need for a global monetary authority. Moreover, the recent statement by the IMF (2012), indicating that policymakers in countries where capital flows originate must think about the implications for others, goes in the same direction. Evidently, relying on the US to set global monetary policy will not work if the US continues to focus only on US outcomes. This was one of, if not the, principal lesson from the failure of Bretton Woods.

3.3. THE FRAMEWORKS WITHIN WHICH A NATIONAL MONETARY POLICY MUST BE CONDUCTED

Without prejudice to the different answers that might be given to the "Impossible Trinity" problem, assume that a country (or currency area) chooses to follow an autonomous monetary policy within a floating exchange rate regime. This suggestion was first made by Keynes (1923), and briefly implemented by Sweden in the middle 1920s. Broadly speaking, this assumption is correct for most large countries (or currency areas) today.

In conducting monetary policy in this way, policymakers are subject to constraints imposed by three separate frameworks. First, the analytical framework constitutes the policymakers' views about how instruments directly under his

[28] See Pringle (2012).

[29] Evidently, a decision by an EME to peg (more or less) its exchange rate to that of an AME eventually leads to an importation of any problems that the AME country might have. However, the links run the other way as well. For example, easy money in the EME can lead to higher inflation and higher priced exports to the AME. Intervention in the foreign exchange markets leads to a buildup of foreign exchange reserves, which will lower longer term interest rates in the AME where these reserves are invested in such assets as US Treasuries.

[30] Committee on International Economic Policy and Reform (2011).

control are linked to the objectives sought by the policymaker. Second, policy must be consistent with an agreed political framework. In this regard, issues pertaining to mandates, powers and accountability are crucial. Third, policymakers are constrained by their philosophical framework. That is, before passing on to operational issues (as discussed in section 3.4), higher level decisions are first required on the robustness of the policy makers belief system, the relative importance of rules and discretion, and on the optimizing procedures that policymakers intend to follow. Each of these frameworks has changed materially over the last fifty years, and each seems likely to change further in light of the current crisis.

3.3.1. The Analytical Framework for Conducting Monetary Policy

Policymaking demands some knowledge (or at least a belief) of the relationship between what the policy maker is trying to control (the objective of monetary policy) and his control instruments (policy rates and the central bank balance sheet). Prior to World War II, European economic thought about how the economy worked, and the particular role of money, was essentially deductive. In contrast, American economists were more likely to formulate theories on the basis of close observation of economic developments[31]. It was perhaps inevitable that these two traditions would merge, since theory without testing (pure deduction) and testing without theory (pure induction) would seem to fall well short of the requirements of the "scientific method". Tinbergen likely deserves credit for this fusion in having created and tested econometrically the first macroeconomic models[32].

By the 1960s, most central banks (especially in the English speaking world) and most academics had accepted that the IS/LM model suggested by Hicks (1937) was a good representation of the views expressed in Keynes' General Theory (1936)[33]. This model could explain how fluctuations in the flow components of the National Income Accounts came about, and, better yet, also led easily onwards to policy conclusions. Subsequently, many central banks (along with many others) began to build econometric models[34] along such lines, with an early and powerful finding being the existence of a trade-off between the rate of

[31] See Haberler (1939) and Laidler (1999).

[32] Backhouse and Bateman (2011). Apparently, Keynes was very skeptical about Tinbergen's work. This reflected his feeling that "animal spirits" would ensure that the functions in the model would be unstable over time. *Ibid.*, p. 14, footnote 9.

[33] This view was certainly not universally accepted. See Backhouse and Bateman (2011). Robinson (1962) famously described this model as a form of "bastard Keynesianism". Leijonhufvud (1968) also expressed the view that many of the most important of Keynes' insights in the General Theory were omitted from the IS/LM framework.

[34] Early examples were RDX1 and RDX2 at the Bank of Canada, and the MPS model at the Board of Governors of the Federal Reserve. DRI was a private sector firm that also estimated an early structural model.

inflation and the level of unemployment[35]. Over the years, models of this sort were altered almost continuously on the basis of both empirical shortcomings and changing beliefs about how the economy worked.

The consensus supporting the use of such models began to break down in the late 1960s. Two factors played key roles; facts and theory. First, the simultaneous rise of both unemployment and inflation in the late 1960s and early 1970s was simply not explainable using traditional empirical models. Second, as noted above, Friedman (1968) and Phelps (1968) had already introduced the concept of the NAIRU (the Non Accelerating Inflation Rate of Unemployment) or the Natural Rate of Unemployment. The important implication was that there was no long run trade-off between unemployment and inflation since inflationary expectations were endogenous. Even assuming adaptive expectations, inflation would rise at an accelerating pace given any given degree of excess demand. The turbulent decade of the 1970s, which included two major shocks to oil prices as well, also led to a much greater emphasis on modelling supply side shocks and other factors explaining inflationary expectations.

The poor forecasting performance of Keynesian structural models during the 1970s also fostered, for a time, increased acceptance of much simpler (reduced form) models based on the "monetarist" theories of Milton Friedman. These models suggested that nominal GDP could be reasonably well forecasted on the basis of the previous rates of growth of monetary aggregates. In effect, money growth would drive inflation and inflationary expectations, while Friedman expected that real growth would quickly return to trend once shocked away from it. Evidently, this last assumption deviated fundamentally from the Keynesian assumption that capitalist economies in "Deep Slumps" might stay there forever without activist government policies[36].

Unfortunately, those accepting this "monetarist" logic, including those central banks that had adopted monetary targeting, were quickly disappointed. The stable demand for money function, on which the whole monetarist framework was based, proved to be an illusion. In particular, technological developments (for example, "sweep" accounts in the US) led to a sharply lower need for narrowly defined money in many countries. The demand for money that was more broadly defined was also increasingly affected by the invention of new money "substitutes"[37]. Monetary targets subsequently became much less fashionable, though

[35] The earliest empirical evidence on this was provided by Phillips (1958). Such "Phillips curves" were then added to models based on the IS/LM framework to provide a link between real variables and inflation.

[36] As noted briefly above, Friedman's assumption was similar to that of Hayek. The latter also assumed that the economy would mend itself. In contrast, government interference would only perpetuate the factors that had led to the slump in the first place.

[37] With the growth of "shadow banking" over the last decade or so, this last complication has become ever more important.

monetary indicators remained an important guide for policy at some central banks, the Bundesbank in particular. These policy issues are returned to below.

Friedman's assumption that unemployment could be only a temporary phenomenon, combined with two other theoretical advances concerning expectations, then powered a massive shift in orientation. This affected academic economists in particular. First, Sargent and Wallace (1970) replaced the assumption of adaptive inflationary expectations with that of rational expectations (RE); that is, people's expectations had to be consistent with the outcomes generated by the model itself. While the logic of this seemed compelling[38], it did require the assumption of a single "representative agent" and a relatively small model to be computationally tractable at that time. Given these assumptions, Sargent and Wallace were able to demonstrate that changes in monetary policy would have only the briefest of impacts on real variables in the economy. Second, Lucas (1980) noted that virtually all structural equations have imbedded in them some process of forming expectations, and that any change in the monetary policy "regime"[39] would therefore render "unstable" any structural equations estimated on past data.

The combination of these insights led to two different strands of modelling. Both emphasized relatively small and internally consistent models, based on maximizing behaviour on the part of representative economic agents. Thus, both contrasted sharply with the large structural models that had come before. Moreover, both focused on the problem of controlling inflation. On the one hand, Real Business Cycle models were based on the further assumptions of rational expectations and essentially instantaneous market clearing at full employment. Deviations from full employment then became solely due to technology shocks or changes in the preferred trade-off between work and leisure. On the other hand, New Keynesian models made essentially the same assumptions, but assumed various kinds of "frictions" that slowed down the reestablishment of full employment[40].

It was perhaps inevitable that these two strands of thought (sometimes referred to as Modern Macroeconomics) would eventually merge into what came to be called Dynamic Stochastic General Equilibrium models. An important practical aspect of these models is that they make no reference to money or credit, and they have no financial sector. Further, particularly among academics, certain beliefs

[38] Mankiw (1988), p. 440 states that economists normally expect economic agents to demonstrate rationally maximizing behavior. Against this background, "It would be an act of schizophrenia not to assume that economic agents act rationally when they form their expectations of the future".

[39] Note that the Lucas critique applies to only changes in the policy "regime" (say a change in the parameters of the Taylor rule), not to changes in policy itself (say the policy rate). Since policy regime changes are likely to occur only infrequently, this must then lessen the practical relevance of the Lucas critique of large structural models. For a convincing discussion of the theoretical shortcomings of both the Rational Expectations hypothesis and the Lucas critique see Frydman and Goldberg (2011).

[40] Fashions changed here as well. Earlier research assumed sticky wages, whereas the later literature relied more on sticky prices. See Mankiw (1988), p 446.

hardened into paradigms with the upshot being that eventually only certain approaches to theory were deemed legitimate[41]. Indeed, Morley (2010), pp. 13-14 suggests that Modern Macroeconomics eventually came to define a "method" rather than a "subject matter". As a result, little effort was made to evaluate the forecasting capacity of these models, either in or out of sample.

While DSGE models were the mainstay of macroeconomic modelling at academic institutions, central banks followed a more eclectic path[42]. Many central banks estimated DSGE models, but their relevance to actual policy decisions seems to have been quite limited[43]. Most also continued to forecast and do simulations with their large structural models, albeit sometimes adapted to support the natural rate hypothesis and to allow experiments with various forms of expectations formation. However, perhaps as a corollary of the earlier disappointment with the monetarist experiment, monetary aggregates and credit essentially disappeared from the empirically estimated structural models as well. As with the competing DSGE models, monetary policy came to be represented by a Taylor rule which set policy rates so as to hit inflation objectives over a period of time.

Looking forward in light of the crisis, there seems to be a significant likelihood of another phase shift in how central banks see their actions affecting the real economy. Similar to their questioning of prior beliefs in the late 1960s, some central bankers have become increasingly sceptical about the usefulness of the analytical frameworks they had previously relied upon[44] to help guide policy decisions. Perhaps the main reason for this sense of unease was that none of the macroeconomic models in wide spread use before the crisis (neither DSGE models nor larger structural models) predicted it. Indeed, such crises were literally ruled out in DSGE models by the assumption[45] of self-stabilisation. Not surprisingly, the first issue raised by the crisis is whether this assumption ought not to be dropped, not least because of the significant economic damage likely to result from financial instability[46]. Leijonhufvud (2009) has linked the pre and post crisis literature by noting that economies may have only a "corridor of stability", outside of which instability reigns. Economies can then be pushed "too far", not least by overly expansionary monetary policies.

In fact, alternative lines of macroeconomic and monetary research are now being

41 See Leeson (2000) and Laidler (2009), pp. 17-18. For a discussion of why economic beliefs can take on "theological" qualities, see Häring and Douglas (2012).

42 For the relative contributions of central bankers and academics to the conduct of monetary policy, see Blinder (1995).

43 Roger and Vlcek (2012) note (p. 18), "Most central banks still use semi structural models as their core model in forecasting and policy analysis".

44 Prior to the crisis, and particularly close to the end of the "Great Moderation" the prevailing sentiment was that our knowledge had advanced significantly. See Romer and Romer (2002) and Blinder (2005).

45 White (2010).

46 There is now a huge literature documenting the history of financial crises, and the particular role played by dysfunctional financial systems. See Reinhart and Rogoff (2009), Schularik and Taylor (2009) and Reinhart and Reinhart (2010).

pursued much more actively than before the crisis[47]. Perhaps the best candidate to replace extant theories would be models that recognize the importance of fiat credit in influencing economic decisions (to both spend and to produce), the importance of stocks (in particular stocks of debt) and the endogeneity of risk in the financial system[48]. These models can produce highly non-linear results similar to those observed in real life crises. This approach has similarities with some pre War business cycle models[49]. As well, insights can also be gained from the new, and rapidly developing, study of complexity economics[50]. This approach is at the other end of the stability spectrum from DSGE models in that complexity economics assumes many agents (no representative agent), each acting according to local rules (no concept of rational expectations), and it eschews all concepts of equilibrium. There are many parallels in this regard with evolutionary biology.

3.3.2. The Political Framework for Conducting Monetary Policy

It is important to note that monetary policy must be conducted within a political framework, which also constrains the capacity to match theory with practice. Here too there have been important developments over time. In the immediate post war period, central banks were generally firmly under the control of their Treasuries. In the US, the Treasury – Federal Reserve "Accord" was a good example of this. Over time however, central banks were increasingly given some form of "independence". Note that this word is highly misleading, in that no government institution can be wholly independent in a democratic society. Indeed, it is likely the case that a central bank cannot sustainably follow policies that do not have public and popular support[51]. A more nuanced approach[52] to the independence issue would distinguish between a central bank's mandate, its powers and its democratic accountability.

[47] For example, INET (the Institute for New Economic Thinking) was set up in 2010 and has attracted some of the world's most prestigious scholars. In 2012, the OECD began the NAEC project (New Approaches to Economic Challenges)which also aims to challenge conventional thinking. The work of the Santa Fe Institute, and others engaged in "agent based" modeling is receiving increased attention, as is the work of scholars working in the tradition of Minsky (2008). See in particular, Keen (1995) and a long list of his later publications.

[48] An early modern sponsor of such research work was the Bank for International Settlements (BIS). In addition to its Annual Reports from the mid 1990s onwards, see the many BIS Working Papers by Claudio Borio and coauthors. Not surprisingly, this coauthor also recommends Borio and White (2003) and White (2006).

[49] Not least, the Austrian school led by Hayek and von Mises, and the work of Dennis Robertson. See Laidler (2009) p. 40. Issing (2013) suggests that, rather than a new paradigm, we simply need to remember some of the principles that served the Bundesbank so well of the post War period. In particular, he asks "How long will we have to wait until the neglect of money and credit in monetary theory and policy will be understood as the major source or macro policy mistakes?" Of course, the principles to which Issing alludes were themselves developed on the basis of theories and practical experiences drawn from the pre War period.

[50] See the many references in Ball (2012) p. 37. In their basic assumptions about how the economy functions, complexity theorists and the Austrian school of thought seem to have a lot in common.

[51] See Silber (2012) who records Volcker's belief that he both needed and obtained public support to pursue the fight against inflation in the early 1980s.

[52] Crow (1993).

Many central banks began the post war period with a mandate that was extraordinarily broad. They were expected to meet many objectives simultaneously[53], and often conflicting objectives at that[54]. However, as these conflicts became more apparent in the course of implementing monetary policy in practice, central bankers came to focus on a significantly narrower set of objectives (discussed below). In a number of countries, the objective of monetary policy was clarified further by ranking the priority of objectives[55]. For example, this has been explicitly the case in specifying the mandate for the European Central Bank.

As to where the mandate comes from, there is a wide spectrum of possibilities reflecting the chosen trade-off between flexibility and immutability. At one end of the spectrum, the central bank sets the mandate for itself. In other cases, the central bank has announced its mandate jointly with the government. In still other cases, legislation (or in the case of the ECB, an international treaty) determines the mandate and, in extremis, the mandate becomes part of the country's constitution. While some have seen the involvement of governments as a threat to central bank "independence", others have welcomed this involvement. It effectively ensures that government cannot subsequently try to impede the central bank in the pursuit of a mandate given by the government itself. Further, such government involvement in central bank affairs might implicitly put welcome constraints on the pursuit of active fiscal policies by the government itself.

As to powers, the use of policy instruments under the central banks control, free of political interference, is what most people would consider to be the essence of "independence"[56]. In effect, one cannot "will the ends" without "willing the means". This trend too has evolved over time, and for various reasons. In the early 1960s, the Coyne Affair in Canada highlighted that, if there were to be subsequent accountability, a clear assignment of responsibilities between the government and the central bank was needed[57]. The growing recognition that political pressures would always give primacy to shorter term objectives, regardless of longer term costs, was a further argument for putting "technical issues" more firmly in the hands of officials that did not need to be re-elected. Further, as the pursuit of price stability moved closer to the core of the central bank mandate, the perception that inflationary expectations might be sticky, and that the short

[53] Consider for example, the mandate given to the Bank of Canada in 1934 "WHEREAS it is desirable to establish a central bank in Canada to regulate credit and currency in the best interests of the economic life of the nation, to control and protect the external value of the national monetary unit and to mitigate by its influence fluctuations in the general level of production, trade, prices and employment, so far as may be possible within the scope of monetary action, and generally to promote the economic and financial welfare of Canada."

[54] In addition to problems posed by the Impossible Trinity, there was the recognition that the pursuit of lower unemployment, beyond some limit, would lead to higher inflation.

[55] For example, the ECB has been given the mandate of pursuing price stability, but also of maximizing growth, providing it is consistent with the first objective. In contrast, the Federal Reserve Board has been given a dual mandate with no preference given to either.

[56] Debelle and Fischer (1994) labeled this "instrument independence".

[57] See Siklos (2007).

run Phillips curve might be flat, implied that the costs of political interference might also prove very high. Thus, such influence should be avoided.

Some means of holding central banks democratically accountable constitutes the third part of the political framework. In principle this has both an ex ante and an ex post aspect to it. The ex ante aspect has to do with transparency, and the capacity of a central bank to explain its actions clearly. This aspect has also changed greatly over the years. For much of the post war period, central banks cultivated a mystique of knowledge based essentially on the principle of "never apologize, never explain". However, this began to change in the 1980s, and by the late 1990s central banks almost everywhere were publishing specifications of internal economic models, inflation reports, minutes of meetings, etc. Theory also contributed to this change, in that it became increasingly believed that expectations (both on the part of Wall Street and Main Street) could be directly affected by the stated beliefs and intentions of central banks. This is pursued further below.

Ex post accountability has to do with central bankers failing to fulfil their mandate. Again there have been significant changes. A variety of mechanisms have been put in place to ensure that an explanation is given whenever mandates are not met. For example, some inflation targeting central banks must now write a letter to the appropriate government official explaining their failure to hit agreed targets. Hearings before committees of elected representatives are an increasingly common approach. Beyond this, however, few central bank governors have been dismissed or otherwise sanctioned for a failure to achieve the central bank's mandate[58]. Similarly, in those countries where the government has the explicit right to send a "directive" to the governor of a central bank, to force a change in policy[59], this right has never been exercised. Presumably, such ex post action has been eschewed for fears of causing turmoil in financial markets.

Looking forward in light of the crisis, there are grounds to believe that the political framework constraining the conduct of monetary policy will change. The very capacity to classify the governance process into mandate, independent powers and accountability depends fundamentally on the mandate being rather simple. However, as will be discussed below, a debate is already under way as to whether other objectives than price stability ought not to be given higher priority[60]. If these other priorities are also likely to be pursued by other arms of

[58] The Bank of England provides a good example of such forbearance. Between 2011 and 2013, as inflation repeatedly exceeded target levels, the Governor of the Bank had to send repeated letters of explanation to the Chancellor of the Exchequer.

[59] This right exists in both Canada and the Netherlands. The unstated assumption is that the head of the central bank would resign if such a directive were sent.

[60] In White (2006), I asked specifically "Is Price Stability Enough?" I concluded, as had many pre War scholars, that the single minded pursuit of such a mandate by a central bank was no guarantee of macroeconomic stability.

government (say preventing financial instability with potentially high costs for taxpayers), then closer links between central banks and governments would seem almost inevitable.

Moreover, in the course of trying to manage the crisis, many central banks have done things that have already brought them much closer to governments. In Europe, for example, the ECB has purchased (or accepted as collateral) assets of lower quality and longer maturity than has been traditional. In consequence, it has exposed itself to the risk of losses and even the potential need for recapitalisation. Similar, perhaps even greater, potential losses might affect other major central banks as well. Even if it can be argued that central banks do not need capital to carry out their functions[61], such financial losses would likely involve a huge reputational loss as well. Further, by offering to purchase sovereign assets on a significant scale (the OMT initiative), the ECB has opened itself to the charge that it is cooperating in the reestablishment of "fiscal dominance" in Europe[62]. Finally, there can be no doubt that many central banks have carried out operations with significant distributional implications[63]. Given that distributional issues are essentially political and not technical[64], this also implies closer links between central banks and governments. While it is true that these links might be reversed once the crisis ends, history would suggest this will not be done without significant effort and strong popular support for renewed "independence"[65]. Such support might or might not be forthcoming, depending on how views developed about the culpability of central banks in contributing to the crisis in the first place.

3.3.3. The Philosophical Framework for Conducting Monetary Policy

The third structural aspect conditioning the conduct of monetary policy could be described as the philosophical framework[66]. How do central banks approach decision making? Three important issues can be identified. The first has to do with the "rhetoric of economics"[67]. The second has to do with the relative merits

61 As long as central bank liabilities remain acceptable as means of payment, capital is not required to maintain confidence. The counterargument has to do with the qualification "as long as". There is no telling what might be the trigger for a run on central bank liabilities and the currency.

62 Two senior German officials resigned from the ECB in protest against similar ECB actions. The current President of the Bundesbank has repeatedly declared his opposition to the OMT program.

63 One example would be selective access to central bank lending facilities. Of much greater significance has been the decision of virtually all central banks to keep interest rates very low for a long period. This clearly redistributes income on a grand scale from creditors (savers) to debtors. Moreover, while such policies might help for a period of time to improve the solvency of banks, low interest rates on longer term securities will over time threaten the solvency of insurance companies and pension funds. See White (2012).

64 On this, see Leijonhufvud (2009).

65 See Capie (2013).

66 Mervyn King, then Governor of the Bank of England, may have been alluding to such issues when he wrote "Economics is not a set of doctrines but a way of thinking".

67 This phrase was introduced by McCloskey (1985) in a book of the same name. Rhetoric was defined by Aristotle as the need to use "all available means of persuasion".

of rules and discretion, and the third is the choice of a central banks optimizing principle. All of these issues have been widely debated over many decades and fashions have ebbed and flowed.

The "rhetoric of economics" has to do with the belief system of central bankers, the kinds of evidence they use in justifying those beliefs, and their willingness to change those beliefs. Across central banks, there are wide differences in what is believed, with the particular history of individual countries often playing a central role[68]. For example, central European central bankers believe inflation is the predominant threat to macroeconomic stability. This reflects the hyperinflation of the 1920s. In contrast, for those in English speaking countries, unemployment is seen as the biggest threat. This reflects their experience of the Great Depression. It is notable that, when the financial crisis worsened in 2008 but with inflation still rising, the ECB raised policy rates while the Federal Reserve continued to loosen.

As to other kinds of evidence referred to by individual central banks, the historical experience of other countries seems to have had virtually no role to play. For example, in the run up to the current crisis, the similarities with Japanese developments in the 1980s and pre War crises were totally discounted. In contrast, over time, the role of econometric and mathematical evidence was given greater weight virtually everywhere. There is, however, no reason to doubt that, in interpreting such evidence, central bankers also shared in that trait of human nature that selectively chooses evidence to support beliefs already established[69]. Finally, for most central banks, their willingness to reject old beliefs and embrace new ones was greater in the 1960s and 1970s than more recently. The Great Moderation in the AMEs convinced most central bankers (from the countries affected) that the policies they had been following were fundamentally sound. The fact that the monetary policies followed since the beginning of the crisis have essentially been "more of the same"[70] further attests to the tenacity of the earlier belief system.

The rules versus discretion debate was popularized by Friedman in the 1960s. He believed that a rule providing stable growth for the money supply would lead to stable prices, which he believed ought to be the principal objective of central bank policy[71]. A number of central banks subsequently established "monetary

[68] White (2011).

[69] Psychologists refer to the phenomenon of "cognitive dissonance". Human beings give little attention to evidence that conflicts with the prevailing paradigm, until the evidence becomes so overwhelming (and the cognitive dissonance so great) that a paradigm shift is required. See Kuhn (1962). From personal observation over many years, I have yet to see a serious piece of economic research from a central bank that failed to uphold the belief system of the central bank in question. See also Grim (2009) and Haring and Douglas (2012).

[70] By "more of the same" is meant the pursuit of policies designed to stimulate short term aggregate demand, without any serious consideration of possible medium term unexpected consequences. See BIS (2010) and White (2012).

[71] Although Friedman (1959) did not mention it, this idea goes back at least to Henry Simons of the University of Chicago in the 1930s. Leeson (2000) documents the process through which Friedman's ideas became so widely accepted in the 1970s.

targeting regimes", although the rules were often interpreted quite flexibly[72]. Even the Bundesbank, which was an early advocate of such regimes, was prepared to set aside its intermediate monetary targets if they seemed to conflict with its ultimate inflationary goals[73]. As noted above, the perceived instability of the demand for money eventually led to the end of these targeting regimes. Nevertheless, the Bundesbank and the European Central Bank continue to monitor monetary ("second pillar") developments quite closely, recognizing the presumed longer run association between monetary developments and inflation.

Despite this particular setback, the rules versus discretion debate has continued in other ways. In the 1960s, as central bankers were given a freer hand to set monetary policy, changes in policy instruments tended to be made in a highly discretionary way. Policymakers looked at a host of "indicators" to help them decide what to do[74]. While the pursuit of a monetary rule proved a dead end, it nevertheless gave a taste for what rules could provide. In particular, rules aid transparency (of which more below) and greatly simplify the policy making process. In any event, one simply cannot look at every relevant indicator (de novo) all the time.

Perhaps reflecting such considerations, central banks have tried to simplify the basic framework they use to guide their policy actions. However, major central banks seem to have drifted apart in their views about what constitutes best practice in this regard[75]. Contrast, for example, the Federal Reserve with its "one pillar" (the output gap), the ECB with its "two pillars" (output gap and monetary pillar) and the Bank of Japan with its "two perspectives" (output gap and the need to avoid another credit bubble). However, what unites these central banks is their common reliance on the use of a Taylor rule which links deviations of the policy rate (from the natural rate) to indicators of projected inflation[76], in particular the output gap. Some central banks have gone even further (Norway, New Zealand), giving forecasts of future policy rates conditional on forecasts of the variables entering the Taylor rule.

Another aspect of the debate has centred around the "time inconsistency problem" identified by Kydland and Prescott (1977). They pointed out that policymakers, bound only by discretion, would promise to deliver a low inflation rate but would then provide greater than expected stimulus to artificially raise

[72] For example, central banks sometimes shifted focus from one monetary aggregate to another. The fact that different monetary aggregates had different income and interest rate elasticities meant that targeting different aggregates had different implications for the setting of policy rates.
[73] See Cagliarini (2010).
[74] For an early introduction to this literature see Brunner and Meltzer (1969).
[75] For a discussion of such differences, see White (2011).
[76] Monetary rules were a precursor of the Taylor rule, in that the operating procedure followed was to invert the estimated demand for money function and determine (conditional on a forecast for real demand and prices) what path the policy rate had to follow to hit the money supply target by a certain date.

output. Rational agents, however, would see this coming and the output benefits would not materialize. The end result would be a "too high" inflation rate. Kydland and Prescott then went on to suggest that this outcome might be prevented by the imposition of a fixed rule concerning inflation. Needless to say, Blinder (1995) and likely most central bankers, have questioned the practical relevance of this advice reflecting their belief that central bankers would never behave in the underhanded way that Kydland and Prescott assume.

The choice of an optimizing framework for the conduct of policy is a third philosophical issue. Should policy makers focus on maximizing output growth over time, or rather conduct their policy so as to avoid truly bad outcomes, a kind of minimaxing strategy? Looking backwards, a common thread has been maximization, perhaps in large part because the extant models did not allow for truly bad things to happen. The worst that could be expected was an upward shift to inflationary expectations, but even this was generally ruled out in the models by the assumed "credibility" of central banks and their commitment to keep inflation low.

It would be tempting to think of the Federal Reserve's pioneering introduction of a "risk approach to monetary policy", in the early years of this century, as a deviation from the single minded focus on maximizing output. However, the particular risk of concern to them was the risk of a Fisher type debt-deflation arising from the debt "headwinds" generated by earlier credit expansions. Accordingly, their "risk approach" actually implied that the Federal Reserve should be inclined towards an easier monetary policy than traditional indicators would have implied[77]. Thus, in practice, central banks continued to be encouraged by their belief system to push the limits of growth as far as possible.

Looking forward in light of the crisis, changes seem likely with respect to all three elements of this philosophical framework. The "rhetoric" of central bankers looks set to change in many ways. Since the crisis was so unexpected, and so impervious to stimulatory policies that worked in previous crises, it might well encourage central bankers to rethink previous beliefs. Moreover, they might also be expected to revisit the evidence on which those beliefs were based. If this happens, formal macroeconomic models seem likely to have less influence over policy decisions in the future and the analysis of historical events rather more. Fortunately, as noted above, there has already been an explosion of historical studies of earlier crises across a wide range of countries to help guide future policy.

Whether this possible questioning of previous beliefs will culminate in a "paradigm shift" still remains to be seen. First, as Kuhn (1962) has stressed, paradigm

[77] See Hannoun, H. (2012) and also Taylor (2010) for evidence that, in recent downturns, the Fed has lowered policy rates much more than was suggested by the Taylor rule.

shifts are always very hard to achieve. Second, Steven Cecchetti, Economic Adviser at the BIS, has made the valid point that "It takes a model to replace a model", and we are very far from having a viable alternative model. Third, to shift one's beliefs is an admission of previous error, and central bankers will have a strong aversion to doing this. Indeed, there are still many in academia, some with long associations with central banks, who contend that the crisis need elicit no significant change in the way monetary policy has been conducted[78]. Fourth, and closely related, many now point to shortcomings in the regulatory framework as being primarily responsible for what happened. The fact that, in the wake of the crisis, a number of central banks have been given significantly stronger regulatory responsibilities could well support that viewpoint[79].

As for the rules versus discretion debate, the crisis could well swing the balance back towards discretion. To the degree that central bankers become inclined to question how much they really know about how the economy operates, they will be wary of rules that might be "wrong" rules. Finally, given such recent evidence of massive tail events, the need to formulate policies to avoid truly bad outcomes should receive more attention. Central bank optimizing frameworks could then swing from maximizing to minimaxing. In this context, there should be greater interest in procedures that are "robust" in the face of large shocks[80]. Nevertheless, the fact that monetary policy since the crisis has continued to focus almost exclusively on output gaps and price developments suggests that this change in orientation, while possible, has not yet happened.

3.4. PRACTICAL ISSUES IN CONDUCTING MONETARY POLICY

Alongside the constraints imposed on central bankers by the Impossible Trinity and the three frameworks just discussed, the conduct of monetary policy has been complicated by three other practical issues. First, there must be agreement on the objective being sought in the conduct of monetary policy. Second, even if policymakers claim (at any moment in time) to be reasonably certain about what model best describes the workings of the economy, there remains considerable uncertainty about parameter values, and the nature of exogenous shocks. Third, processes are required to actually formulate and then implement the monetary policy

78 For an example, see Mishkin (2011).

79 The greater involvement of central banks has primarily reflected the view that traditional financial regulators lack a sufficiently "systemic" orientation. Central bankers were thought more likely to have such a systemic perspective, on the workings of the financial system in particular, even though there was little practical evidence of such an orientation in the run up to the crisis.

80 A seminal reference is Brainard (1967). For some practical work in this vein, see some of the recent publications of the Norges Bank. In particular, Vikoren (2013).

decided upon. Over the last fifty years, there have been major changes with respect to each issue. Moreover, looking forward in light of the crisis, further changes seem likely.

3.4.1. Choosing the Objective of Monetary Policy

Choosing an objective for monetary policy is logically distinct from having a model of how the economy works. That said, changing views about how the economy works, and the limitations of monetary policy, can certainly influence the objectives sought. What is a fact is that, over the last fifty years, the objective of monetary policy has changed markedly and repeatedly. Indeed, against the backdrop of history, the speed of regime changes has been unprecedented[81].

In the decade or so following the end of the war, there appears to have been an intuitive understanding that there was no trade-off between inflation and unemployment[82]. The one could not then be manipulated to affect the other[83]. However, with time, the belief gradually emerged that such a trade-off did exist. As noted above, empirical work supported this hypothesis and it also played into the growing bias towards activist "Keynesian" policies. The existence of the trade-off led to the important conclusion that policy could lower the level of unemployment permanently if policy makers were prepared to accept a "moderately" higher level of inflation[84]. The primary objective of policy in the 1960s therefore became reducing unemployment until the costs of higher inflation seemed unacceptable.

However, the hypothesis of the Natural Rate of Unemployment, introduced in the late 1960s, led to the conclusion that inflation would continuously accelerate if unemployment were to go below the Natural Rate. Rising inflation in many countries in the late 1960s, even before the oil price shocks of the 1970s, reinforced this view. Policy then became directed at keeping unemployment at or near this natural rate so that inflation could be stabilized. The different reactions to the first and second oil price shocks were manifestations of this transition. Both shocks had stagflationary implications, pushing up inflation and reducing employment as real incomes fell and spending fell as well. In response to the first shock, central bankers tried to stabilize employment. However, by the time of the

81 See Davies (2002) for a very long historical overview.
82 See Romer and Romer (2002).
83 There was at the time a significant body of thought that inflation was essentially a cost push phenomenon. This contributed in various countries (and at various times) to the introduction of wage and price controls.
84 An early and influential paper supporting this conclusion was provided by Samuelson and Solow (1960). However, Hall and Hart (2010) contend that the "hand drawn" curve suggested by the authors actually bore no relationship to the curve that would have emerged had they used the regression techniques available at the time. A more positive aspect of the paper was that the authors noted that the presumed relationship could shift over time. In this regard, they predated the later observations of Friedman and Phelps.

second shock, the priority had shifted to inflation control. As discussed above, this changed preoccupation had already been signalled by the adoption of monetary targets in a number of countries in the latter half of the 1970s.

The Natural Rate hypothesis had led policymakers to question the benefits to the real economy of a lower unemployment rate that could only be maintained temporarily. In addition, growing attention also began to be paid to the associated costs of higher inflation[85]. These costs were becoming ever more evident as the period of high inflation lengthened[86]. Further, it came to be better appreciated that the costs of "living with" high inflation were permanent, whereas the costs of reducing it would be only temporary. Together with a growing concern that high inflation rates would naturally ratchet up, and could not be credibly stabilized[87], these arguments led to the conclusion that the high inflation rates of the late 1980s had to be reduced to much lower levels.

A related issue had to do with the speed of that reduction. On the one hand, the existence of a non-linear short-run Phillips curve[88] and a weak financial system argued for "going slow". On the other hand, a high initial level of inflation and a belief that inflationary expectations could be easily shocked downwards argued for "going fast". Broadly speaking, the pendulum swung from "gradualism" in the late 1970s to "cold turkey" in the early 1980s. The bold action of Paul Volcker in the US, and the increasing importance given to inflationary expectations in the inflation process, likely both contributed to this change.

By the late 1980s, with inflation much reduced, there was almost a universal acceptance by central banks that price stability should be the primary objective of monetary policy. In effect, central bakers had shown empirically that they could do this, and accepted theory said they could not sustainably do anything else. Further, it was widely realized that, in leaning against demand side shocks[89], there was no conflict between the pursuit of unemployment and inflation objectives. This helped significantly in the political battle to "sell" price stability as the principal objective of monetary policy. Closely related, the objective of price sta-

[85] There is in fact much controversy about why policymakers in the US shifted their focus. Meltzer (2009a and 2009b) contends that this conclusion reflects a shift towards policymakers being less willing to tolerate the costs of inflation. Nelson (2012) asserts that it reflected the acceptance of the Natural Rate hypothesis. In fact, it was probably a combination of the two.

[86] See Selody (1990). Among the costs commonly referred to at the time were those caused by distortions to relative prices and the efficiency of the price system, excessively rapid repayment of principle on nominal contracts, higher risk premia and lower fixed investment, the discouragement of longer term capital markets and interaction with the tax system. In the limit, many feared an erosion of trust in government and associated political instability. Volcker explicitly notes this latter concern in explaining the Feds determination to reduce inflation in the early 1980s. Of course, these broader political concerns were by no means new. See Keynes (1923) and Hayek (1944).

[87] See Silber (2012) in which Chairman Volcker repeatedly refers to the possibility (and the dangers) of inflationary expectations coming unstuck in the early 1980s.

[88] A convex Phillips curve implies that holding up unemployment "less but for longer" has a bigger effect on inflation for a given cumulative loss of employment.

[89] The issue of supply side shocks is returned to below.

bility also implied an equal (or perhaps even greater) willingness to lean against deflation as to lean against inflation.

In the early 1990s, a number of central banks went even further by adopting explicit Inflation Targetting (IT) regimes. This trend began in New Zealand and Canada and then spread widely to both other AMEs and EMEs. Interestingly, however, such regimes were not explicitly adopted by the European Central Bank, the Federal Reserve or the Bank of Japan[90]. In effect, IT central banks pledged to set their policy instruments in such a way as to ensure that their forecast of inflation two years hence would be consistent with the target. With time, there was a convergence of views that this target should be of the order of two per cent or less, though there was little empirical evidence to suggest that the economic costs of somewhat higher inflation were indeed significant[91]. A small positive rate of inflation was said to accommodate measurement bias, to facilitate relative wage adjustments and to allow real interest rates to be negative even if interest rates should fall to the Zero Lower Bound (ZLB) in nominal terms[92].

The pursuit of price stability, whether implicitly or explicitly, seemed increasingly validated in the Advanced Market Economies by much better macroeconomic performance. The so called "Great Moderation", which began in the early 1980s and persisted until the current crisis began, was characterized by low and stable inflation but high and stable growth. The conventional wisdom among central bankers at the time was that the benefits promised by stable prices had in fact materialized. Unfortunately, this led to a still more extreme shift in views. Whereas price stability was originally viewed as necessary for sustainable real growth, price stability became increasingly seen as sufficient to ensure sustained growth. Thus, evidence that macroeconomic problems were building up under the surface tranquillity, threatening the very foundations of the "Great Moderation", was systematically ignored. Even the spread of financial crises to the AMEs in the late 1990s[93] was dismissed. These crises were said to reflect only "teething problems", arising from inexperience with new financial instruments and changing technology, rather than manifestations of underlying and perhaps more serious issues.

[90] The reasons differed across the institutions. The Bank of Japan, already facing mild deflation and at the zero lower bound for the policy rate, felt it did not have the technical capacity to hit a positive inflation target. See Yamaguchi (1999). The Fed was fearful of a negative reaction in Congress to downgrading the importance of reducing unemployment. The European Central Bank was closer to the IT model, but gave significant emphasis as well to the second (monetary) pillar when deciding how to set the policy rate.

[91] Central banks also differed in the particular index they chose to stabilize, with food, energy and housing costs being the most controversial. The Federal Reserve chose to focus on "core inflation" which included a proxy (rental equivalent) for measuring the costs of housing services. In contrast, the ECB focused on headline inflation, but without any house cost component at all.

[92] A more recent suggestion that the inflation target might be raised to enhance this latter effect was generally rejected by central banks. See Blanchard (2010).

[93] Two important events were the failure of LTCM in 1998 and the stock market "bust" of 2001.

This complacency can only be explained by recourse to the philosophical framework discussed above. Both fact and theory seemed to support the accepted paradigm of central banks, and a growing hubris invited an extension of its reach. In contrast, had more attention been paid to historical evidence, it would have been noted that financial and economic crises had occurred repeatedly over many centuries[94] and there was no good reason to assume this would not continue. Moreover, most of these historical episodes looked remarkably alike in their dynamics, and also remarkably similar to developments observable in the latter years of the Great Moderation. Further, and essentially, none of the big crises in history had been preceded by any significant degree of inflation. Thus, price stability had not historically been sufficient to ensure macroeconomic stability. Indeed, it could be argued that, if low inflation was in large part due to positive productivity shocks, this should actually have been a signal to raise policy rates rather than to lower them[95].

In addition to the witness of economic history, recourse could also have been made to the history of economic thought. There was a huge pre War literature on business cycles, including the role of money and credit, which was well summarized by Haberler (1937). As well, a later literature emerged based on the work of Koo (2003), Minsky (2008) and researchers at the BIS among others. Broadly speaking, this literature emphasized credit driven "imbalances" in the economic system (speculation and leverage) leading to "booms" and sudden "busts". All of this publically available literature was essentially ignored by major central banks. So too were any warnings implicit in the papers prepared for the private meetings of central bankers at the BIS itself[96]. Thus, when the crisis broke in 2007, it came as a complete shock to many central bankers and elicited the usual human response to such events – denial[97].

Even in those cases where the possibility was entertained of trouble building up under the surface, it was argued that it was not possible for monetary policy to do anything about it. Interestingly, this argument was generally couched in terms of the difficulties of "pricking asset price bubbles" rather than leaning against the

94 To support these assertions, see the historical studies referred to above.

95 For an analytical treatment of positive productivity shocks see Selgin (1997) and Beckworth (2008). In the 1920s Hayek felt that the absence of inflation in the US, in spite of sharp increases in productivity, was a sure sign of trouble ahead. See Haberler (1984). In effect, monetary stimulus was required to prevent prices from declining (in a "good deflation") and it was this stimulus that would lead to "malinvestments" and eventual crisis. An argument more pertinent to the present crisis would be that EMEs (not least previously centrally planned economies like China and the countries of Central and Eastern Europe) exported a significant degree of disinflationary pressure to the AMEs with the same results forseen by Hayek.

96 Poole (2012) notes that he had attended FOMC meetings for fifteen years and had never heard a discussion of these issues. This implies that those people attending both the BIS meetings and the FOMC meetings never brought back any of the discussions at the former to the attention of the latter.

97 For example, when the crisis began it was said to be confined to the US subprime market. Then, it was seen to have much wider financial implications, but these were said to constitute a liquidity problem only. Only much later was it admitted that bank insolvency might also be an issue. Moreover, the idea that these financial problems could affect the real side of the economy was denied for almost two years until the global recession struck in 2009.

broader range of credit driven imbalances characteristic of a boom. Presumably, this criticism reflected the fact that it was easier to discredit the idea of "pricking asset price bubbles" than discrediting a broader based approach which recommended credit restraint. Moreover, to ensure the perception that monetary policy would nevertheless retain its potency, it was also asserted that cleaning up after the bust would be relatively painless[98]. Even after interest rates had been reduced to the ZLB, this assertion that monetary policies would continue to be effective was implicitly maintained through the repeated application of non-traditional monetary policy measures. Unfortunately, maintenance of this belief also mitigated against the search for alternative policies that might have been much more successful in helping the economy recover from the crisis in a sustainable way.

Looking forward in light of the crisis, the objective of monetary policy might or might not change again. It is certainly notable that the FOMC of the Federal Reserve Board announced in 2012 that it would not tighten policy until the unemployment rate fell to 6 ½ per cent, a real rather than a nominal objective. It is not clear, however, whether a similar objective would be chosen once the economy is once again growing normally. Another source of uncertainty has been the recurrent call by the leaders of the G20 for the achievement of "strong, sustained and balanced growth". What is not clear is whether the reference to "balanced" reflects the desire that credit driven "imbalances" in the future be monitored and resisted before they eventually culminate in crisis. While this might be hoped, such an interpretation would seem inconsistent with the "ultra-easy monetary policy" actually followed during the crisis which has had the side effect of aggravating the imbalances which already existed.

Looking forward, another uncertainty has to do with the broader role that central banks might play in the pursuit of systemic stability, not least with respect to the financial sector. Perhaps the only thing that is clear is that a greater focus on systemic issues will generally call for more central bank involvement. Nevertheless, as noted above, there is still an on-going debate about the respective roles played by easy monetary policies and inadequate regulation in the run up to the current crisis. As a result, there is not yet any agreement as to what role, if any, monetary policy should play in "leaning" against future credit crises. As for the assignment to date of responsibility for macroprudential policies, it has in fact varied widely across countries. This indicates a clear lack of consensus, both as to what needs to be done and who should do it.

[98] For a fuller discussion of the "Lean versus Clean" debate, see White (2009). While easy monetary policies are often referred to as Keynesian, such monetary policies were recommended in Keynes' Treatise of 1933 and not the General Theory of 1936. By the time of the latter publication, Keynes had developed the notion of the "liquidity trap" and had concluded that monetary stimulus would not suffice to restore full employment. See Kregel (2011).

On the one hand, some say that the fundamental issue is the pursuit of macroeconomic stability and central banks must take overall responsibility. They should accept that they have a variety of objectives, commonly referred to as price stability and financial stability, and should oversee the use of a variety of instruments to achieve them. Evidently, this would sometimes demand more complicated trade-offs than under previous regimes[99]. One implication might be a simple lengthening of the policy horizon (currently about two years) over which the objective of price stability is pursued. A longer horizon would allow for monetary policy to pre-empt prospective boom-bust processes that might eventually threaten deflation and financial instability. Put otherwise, a longer horizon would allow inflation to dip temporarily below desired levels in response to tighter policies directed to slowing excessive credit growth.

On the other hand, some have recourse to the Tinbergen assignment principle and suggest that central banks should continue to focus on price stability alone. This would imply the assignment of macroprudential instruments to some other institution. An ancillary advantage would be political. Vesting too much power in one institution could invite a degree of political oversight and accountability that might in the end subvert the central bank's capacity to make "independent" and essentially technical judgements about what policies to pursue. This line of reasoning would also argue for giving responsibilities for microprudential and Conduct of Business oversight to institutions other than central banks.

Were central banks to begin leaning against incipient credit bubbles, two sets of indicators would have to be monitored by someone. First, there is the possibility of credit-driven problems on the real side of the economy feeding back on to the health of the financial system. A considerable amount of quite parsimonious work on such indicators has already been carried out, but much more work is needed[100]. Second, there is the possibility of strains emerging within the financial sector and feeding back on the real side of the economy. The data requirements for assessing this are great, and have been a particular focus of G20 work[101]. The work of Reinhart and Rogoff (2009) reminds us that both chains of causation have been seen repeatedly in history. The work of Reinhart and Reinhart (2010) and Jorda *et al.* (2012) further indicates that, when both channels are operative, the crisis is likely to be particularly deep and long lasting. The implication of these insights is that both strands of empirical work are of significant importance.

[99] Potential conflicts among competing objectives should not, however, be overemphasized. In talking about past policy regimes that were the predecessors of today's inflation targeting regimes, Laidler (2007, p. 8) states "These regimes in short have a long intellectual pre-history during which the stabilization of inflation was by and large not treated as a policy goal separate and distinct from mitigating the (credit) cycle and maintaining financial sector stability, but as a key means of promoting precisely these ends".

[100] See Borio and Lowe (2002), Borio and Drehmann (2009) and Barrell *et al.* (2010).

[101] The status of this G 20 work is regularly assessed. See Financial Stability Board (2012) This G 20 work is closely related to suggestions made by Cecchetti *et al.* (2010) and the Issing Committee (2009) on the need for "risk maps" to identify vulnerabilities in the financial sector.

3.4.2. Dealing with Uncertainty about the Monetary Transmission Mechanism

Models that assume instantaneous (or almost) market clearing and rational expectations imply few uncertainties in the conduct of monetary policy. Changes in monetary policy are quickly reflected in changes in prices with few (if any) real side effects. In contrast, as noted above, most central banks rely in practice on models of the IS/LM variety which relate monetary policy instruments to the flows measured in the system of National Income Accounts. Moreover, practitioners continue to believe that monetary policy affects prices only with long and variable lags. The "long" arises from regulated prices, multi-year contracts and overlapping wage settlements. The "variable" arises from the crucial role of expectations at each stage of the transmission mechanism.

Aside from some of the fundamental shortcomings revealed by the crisis, central bankers have always had to cope with other deficiencies in their knowledge about how the economy functions. For example, consider the current debate about the size of fiscal multipliers in Europe. Fiscal restraint was initially pursued on the basis of a belief that the multipliers were small[102]. More recent evidence, however, indicates that the multipliers might actually be quite large. Moreover, the data required to monitor the economy is often inadequate in scope and frequently revised. For this latter reason, measuring the "output gap" in real time is essentially impossible[103], even in normal times. Borio *et al.* (2013) notes the even greater problems faced in the aftermath of a credit bubble, when output levels can be raised to unsustainable levels without a simultaneous increase in inflation. Finally, all systems are subject to unexpected shocks of various sorts.

As for the transmission mechanism of monetary policy, it is generally accepted that changes in policy rates affect other asset prices and the exchange rate, and that these in turn affect aggregate demand, the output "gap" and finally inflation. Unfortunately each of these links is complicated and inadequately understood. For example, interest rates affect spending through substitution effects, distribution effects, wealth effects, risk seeking effects, and sometimes "credit rationing" effects. Exchange rate changes have substitution effects, terms of trade effects, foreign debt effects and can also affect the cost of capital (via imported capital goods). In addition to the sheer complexity of these links, each could easily be influenced by the state of expectations at the time.

[102] Arguments evoking Ricardian Equivalence said the multipliers would be zero. Some European central bankers even said that fiscal restraint would, via increased confidence effects, raise total spending. More recently, the focus has been on the dangers associated with many countries pursuing fiscal restraint together, especially if interest rates were already at the ZLB (therefore no "crowding in" from easier monetary policy). Also see Blanchard and Leigh (2013).

[103] See Orphanides (2001).

To add to the parametric instability implied by changing expectations, we also know that many structural changes have occurred on both the real and financial sides of the global economy over the last fifty years. These might also have affected the transmission mechanism over time. On the one hand, efforts have been made to reduce rigidities in labour and product markets in many countries. Moreover, central bankers have been making ever clearer statements about their objectives and intentions. Both sets of developments bring us closer to a DSGE kind of world where objectives might be expected to be met more reliably than previously. On the other hand, both practice and theory have revealed that the modern economy is much more complicated and rapidly changing than people used to believe. The massive expansion of the "shadow banking" system in recent years, with all its associated vulnerabilities, is a case in point[104]. Perhaps even more important, globalization (both financial and real) is only just beginning to be understood. Nevertheless, early indications are that it might have profoundly changed the transmission of shocks from country to country[105], the inflationary process in some countries[106] and the fundamental nature of "value added" production chains[107].

Looking forward in light of the crisis, a first lesson was discussed above in the context of the "empirical framework" for conducting monetary policy. Models will have to be developed to better reflect the transmission mechanism from monetary policy to credit growth, imbalances and potential crisis. However, a second lesson is also worth drawing. Namely, the transmission mechanism of monetary policy might also change significantly in the aftermath of a burst credit bubble[108]. Risk premia can rise, and debt overhang can pose a long lasting problem[109]. Currencies considered as "safe havens" might rise when they would normally fall as domestic policy rates were lowered. Policy rates can hit the ZLB, which implies they can fall only marginally further[110]. Financial systems, not least the interbank market, can cease to function impeding the normal transfers from lenders to borrowers. All of these developments might reduce the effectiveness of expansionary monetary policy[111].

This raises the broader question of what else might be done by monetary policy to restore growth and confidence in such circumstances. Again, there is great

[104] Adrian and Shin (2010) and Claessens *et al.* (2012).
[105] See IMF (2012) and Fratzscher *et al.* (2012).
[106] White (2008).
[107] See OECD (2013).
[108] In effect, central bankers will have to have two macroeconomic models, one for before the crisis and one for afterwards. This is consistent with Leonhufvud (2009) and his concept of the "corridor of stability". The world may work very differently when the corridor has been exceeded.
[109] See Reinhart and Reinhart (2010).
[110] Some countries, like Denmark, have announced negative rates on cash balances held by banks at the central bank. There are limits to this however. If banks then recoup costs by offering negative rates on deposits, clients may withdraw cash. If banks recoup costs by raising loan rates, this will reduce loan growth and spending in turn. This would, of course, be the very opposite of the results intended.
[111] For a broader assessment, see White (2012).

uncertainty. One possibility is Quantitative and Credit Easing, in effect expanding the balance sheet of central banks in one way or another. It is notable that the policy of the ECB in this regard varies in numerous ways from the policy followed by the Federal Reserve[112]. Not least, the ECB treats its actions as attempts to improve the transmission mechanism of monetary policy, whereas the Fed has increasingly suggested that its policies are a complement to traditional policies at the ZLB. Indeed, the policies followed by the Fed have themselves changed and been given different motivations over time. For its part, and based on its much longer experience with these kinds of policies, the Bank of Japan remained very sceptical about their effectiveness all through the period when Shirakawa was Governor. Since there is no broad consensus on which variant of Quantitative and Credit Easing is most effective, the topic continues to be widely debated.

Another possibility in such circumstances is Forward Guidance about the future stance of monetary policy. Suggestions of this nature seem to assume that central bank statements will have direct effects on private sector behaviour. Fundamentally, this is a variant on the rational expectations hypothesis discussed earlier. This belief has been more firmly held in some countries (say the US) than in others (say Japan). The Fed has gone the furthest with its reliance on communications policy. Consider its repeated references to "measured" policy rate increases between 2003 and 2007, and its more recent promises to keep policy rates at current low levels for some years to come. In contrast, the ECB had resolutely refused to give Forward Guidance until it did so in a very limited way in mid 2013. Given the importance of this issue, significantly more empirical work is required on whether inflationary expectations are in practice "forward looking" and "rationally" based on stated central bank intentions – or not.

Another set of suggestions is closely related but goes even further. Some have suggested that the objective of monetary policy should be changed to give more credibility to the promise that policy rates will be maintained at very low levels for a long time. By suggesting that policy rates will not be raised until US unemployment falls to 6 ½ per cent[113], the Federal Reserve Board has made a move in this direction. Woodford (2012) has gone even further by suggesting that the Fed should pursue a target for the level of nominal GDP. Assuming the target was simply an extrapolation of pre-crisis income level trends, this would imply that a very large nominal output "gap" would have to be filled before policy rates could rise. Finally, in a recent speech, Lord Adair Turner (2013) has suggested that policy makers should consider expanding fiscal deficits even further, with the

[112] For a list of those differences, see Fahr *et al.* (2011). Issing (2013) provides a robust, if implicit, defence of the ECB's practices in criticizing some of the policies pursued by the Federal Reserve after policy rate hit the Zero Lower Bound.

[113] A side constraint was that inflation had to remain below 2 ½ percent.

deficit being financed by a "permanent" expansion in base money issued by the central bank.

Subsequently, numerous practical difficulties have been raised with respect to all these suggestions. However, of greatest concern has been the downplaying of the price stability objective of monetary policy. Coupled with concerns about "fiscal dominance" in many countries, and recent huge expansions in central bank balance sheets, critics of these suggestions worry about a sharp upward shift in inflationary expectations. The suggestion of a "permanent" increase in base money is even more worrisome since, given our lack of understanding of the factors determining the velocity of money, it would seem to leave the price level essentially indeterminate.

By way of a final criticism of these suggestions, a literature is now developing which concludes that a high degree of transparency about the future use of policy instruments might actually contribute more to financial instability than to stabilization of the real economy. Adrian and Shin (2008) write:

> *"If central bank communication compresses the uncertainty around future short rates, the risk of taking on longer term assets financed by shorter term debts is compressed… …In this sense, there is the possibility that forward looking communication can be counterproductive".*

The BIS also made a similar point at various times between 2003 and 2007, when policy rates in the US were being raised month after month in a "measured" way. The word "measured" then became market code for the Fed's intention to raise the Fed funds rate by 25 basis points at each subsequent meeting of the FOMC. Thus, while maturity spreads were falling, the variance term in the Sharpe ratio was falling even faster. Many market participants have subsequently suggested that high transparency was actually an open invitation to the speculation and leverage which culminated in the crisis of 2007.

In the aftermath of the use of non-traditional monetary instruments to fight the current crisis (including forward guidance), interest rate spreads and other measures of risk eventually fell to near record lows. Long bond rates in many countries actually did set record lows. This led many market commentators to suggest that "transparency" might again be having unexpected and unwelcome consequences by encouraging financial asset prices to rise to unsustainable levels. However, others continued to feel that clear indications from the monetary authority (especially the Fed) about the timing and pace of the "exit" from previous policies was appropriate and would contribute materially to the unwinding of speculative positions in an orderly way.

3.4.3. Processes to Formulate and Implement Monetary Policy

The third practical requirement, if monetary policy is to be applied effectively, is a set of processes for changing the setting of policy instruments. Again there have been major changes over the course of the years. Broadly put, the change has been from more informal (and irregular) processes to more formal processes (regular meetings at defined intervals) leading up to more regular changes in policy instruments. As well, there has been a trend away from unilateral decisions on the part of the head of the monetary authority towards the use of committees. However, there continues to be wide variations in the practices followed by different central banks[114].

Over the years, an economic forecast generated by the staff of the central bank moved increasingly to the heart of the process, with particular attention being paid to the forecast for the main objective(s) sought by policy. In recent years, this has implied that the outlook for inflation has taken centre stage. Instruments were then set to achieve the desired objective, generally two or three years out. At regular intervals, this process was repeated with all new information being incorporated[115]. This might seem a rather straight forward process that might be carried out with relatively few resources. However, the devil is in the details. Three particular problems can be identified, and there have been significant changes in practice over the course of the years.

The first practical complication is the need to choose the policy instrument. A few decades ago text books (and some central bankers) would have talked of base money and money multipliers. Eventually, however, this approach was completely replaced by the use of a short term policy rate as the main instrument of policy[116]. The essential reason was the belief that the relatively high variance in the demand function for central bank reserves would lead to wide fluctuations in short term rates given a policy of base control[117]. Coincident with this reorientation, central banks also introduced various administrative rates to provide a corridor of stability within which the policy rate would fluctuate.

A second practical complication has to do with central banks' different attitudes to the speed with which the policy rate should move. Some central banks seem more inclined to move their policy rate by large amounts than do others. On the

[114] These differences apply to size of committees, voting procedures, publication of minutes (length of time delay before publication) and a host of other issues.

[115] A further trend has been to try to model explicitly the implications for the objective sought of different assumptions about exogenous variables (not least, developments in other countries) and uncertainty about the model itself.

[116] Note, however, that central banks control this rate essentially by altering the supply of central bank reserves relative to the perceived demand for such reserves. Again, there are a wide variety of practices in this area.

[117] The seminal article here is Poole (1970).

one hand, large movement might seem required given changes in the forecast, but they might then have to be reversed (embarrassingly so) if the forecast proves wrong. On the other hand, smaller movements might imply the central bank will be "behind the curve" in meeting its objectives. In successive cycles since the early 1980s, the movements in policy rates do seem to have become more extreme (particularly during easing phases). However, it is unclear whether this reflected changing preferences, or rather changing perceptions about the need for more vigorous policy action.

The third practical complication is that information about the state of the economy arrives continuously, whereas forecasts are revised only periodically. Under what circumstances should such information be allowed to feed through to policy instruments in the period between forecasts? A pertinent example would be a sudden downward move in the exchange rate. Should the policy rate move upward automatically to offset this easing in the "monetary conditions index" (MCI)[118], or not? The Bank of Canada first invented this MCI concept in the 1980s, and initially concluded that the policy rate should be allowed to rise. A number of other central banks came to the same conclusion.

However, dating from the 1990s, there was a significant change of views. It became increasingly understood that the source of the shock to the exchange rate mattered in determining how to respond. A decline due to a deterioration in the terms of trade is very different from a speculative run on the currency. The former implies a weaker economic outlook that should not be met by a higher policy rate. In contrast, a speculative run would imply more inflationary pressure and a higher policy rate would be the appropriate response. Evidently, the insight that it matters "why" things happen, has also played a big role in various aspects of the rules versus discretion debate[119].

Looking forward in light of the crisis, a number of the processes referred to above look likely to change. First consider the choice of instrument to be selected for use by a central bank. In current circumstances, with policy rates effectively at zero, emphasis has once again shifted back to quantitative instruments to stimulate aggregate demand. The different practices in this area and the uncertainties they give rise to were discussed above. However, looking further ahead, to a time when a new "normal" has been established, the possibility that financial stability might

[118] The MCI was originally defined by the Bank of Canada as a weighted average of the policy rate and the exchange rate. The weights were supposed to reflect the relative effects of each on real spending on Canadian produced goods and services, and were calculated as a rough average of the elasticities derived from the various models then in use at the Bank. Today, many central banks, and institutions like the OECD, compute such indices using a much broader range of financial variables.

[119] This is essentially the same issue raised by Poole (1970). When policymakers are confronted with a sudden rise in the quantity of money, should they raise rates or not? Poole states that it depends on the source of the movement. If the higher quantity of money reflects increased money demand due to higher (unexpected) spending, then rates should rise. However, if the underlying cause is a shift in the demand for money function itself, then rates should not rise.

become part of the objective function of central banks has major implications. In recent years, there has been growing interest in the use of "macroprudential" instruments to help control excessive credit growth. Which instruments, when, in what order, and what should be the role of traditional monetary instruments? These questions are all now open to vigorous debate[120].

The speed with which policy instruments are used would also be affected. As Borio (2012) points out, financial imbalances tend to build up slowly over time, and then culminate in a sudden and violent crisis. He concludes that policy instruments directed to financial stability should have a similar asymmetric quality. In contrast, others have noted the need to retain market confidence in a crisis. Thus, there is always a danger that a sharp easing in the use of macroprudential instruments (for example, bank capital requirements) might destroy such confidence and then have restrictive effects on lending and the real economy. This disagreement leads to the conclusion that prudential requirements prior to a crisis have to be high enough to offset such a danger[121].

Finally, the crisis has shown that central banks need to be prepared to react more quickly and more powerfully to market signals than they were used to doing in the past. The economic forces affecting growth and inflation tend to work rather slowly, and a measured response to unexpected movements in market indicators (say monetary aggregates or the exchange rate) was generally possible without significant implications for these objectives. However, the crisis has clearly indicated that unexpected movements in market indicators can also be a sign that markets are no longer working normally. The collapse of the interbank market after the failure of Lehman Brothers demanded a rapid central bank response to prevent an even greater degree of financial instability. Central banks will be significantly more conscious of such possibilities going forward[122].

3.5. CONCLUSIONS

Looking back at the conduct of monetary policy over the last fifty years, one must be impressed by the changes observed in every aspect of the business. Exchange rate frameworks have undergone sometimes radical change. Domestic monetary frameworks have also undergone significant changes, with the analytical, political and philosophical aspects all being affected in various ways. Similarly, all of

[120] See CGFS (2010), CGFS (2012), Galati and Moesner (2011) and Moreno (2011).

[121] In the current crisis, the unfortunate truth is that these pre crisis conditions were not met. Thus, we have a continuing debate as to whether it made sense to have tightened capital requirements for banks before the crisis was over. This debate is particularly pertinent to Europe.

[122] There might, however, still be differences about precisely how to respond. Whereas most central banks continued to target their policy rate, even as the interbank rate soared, the Swiss National Bank set a target for the interbank rate and adjusted its "policy" rate accordingly.

the practical problems that must be confronted when conducting monetary policy have elicited quite different solutions at different times, and often quite different solutions in different countries. The objectives sought in the conduct of monetary policy have also changed repeatedly, albeit increasingly focused on price stability prior to the crisis. As well, central bankers came increasingly to recognize the complexity of the monetary transmission mechanism, not least the importance of a properly functioning financial sector. Nevertheless, prior to the onset of the crisis, they generally failed to incorporate such concerns about excessive credit expansion and its subsequent "headwinds" (both real and financial) into their decision making frameworks.

Looking forward, against the backdrop of the crisis, it seems likely that the issues posed by complexity will have to be addressed more systematically. Domestically, it is not clear that the pursuit of price stability and financial stability can be easily compartmentalized. Nor is it clear that policies can be pursued for their short term results, as in the past, without thinking about the longer term consequences. The expectational feedbacks between central banks, Main Street and Wall Street are also of baffling complexity and can easily change over time. Similarly, fundamental and on-going changes to the structure of the economy must also be taken into account. Internationally, it is clear that domestic monetary policies can have important implications for others through a variety of channels; exchange rates, capital flows, bond rates and induced policy responses among others.

Recognizing all this complexity, where do we go from here? Perhaps the first required step is a more whole hearted affirmation of the need for a new analytical framework to deal with all these issues. As noted above, the rapidly advancing and interdisciplinary study of complexity theory might have a lot to offer to macroeconomics. Closely related, such an approach might lead to the conclusion that our current "fiat money" system invites complexity with all its associated dangers. This might then led to a reopening of some old debates, about "narrow banking" in particular. A second required step is to recognize more clearly the international spillovers from domestic policy actions. We urgently need to rethink the foundations of our current international monetary (non) system.

Finally, recognizing both past uncertainties and future uncertainties about how "best" to conduct monetary policy, we should not rely excessively on the use of monetary policies to cure all ills. Monetary policy remains more art than science and the artists remain all too human and fallible. This final conclusion, that we need to widen the array of policy tools directed to economic stabilization, clearly applies to the prevention or moderation of the next crisis. It applies, however, equally or even more strongly to the management of the current one.

REFERENCES

ADRIAN, T., and SHIN, H.S., 2008, "Financial Intermediaries, Financial Stability and Monetary Policy", *Federal Reserve Bank of New York Staff Reports*, No. 346, September.

ADRIAN, T. and SHIN, H.S., 2010, "The Changing Nature of Financial Intermediation and the Financial Crisis of 2007-2009" *Annual Review of Economics* 2, pp. 603-618.

BACKHOUSE, R.E. and BATEMAN, B.W., 2011, "On Post Keynesian economics and the economics of Keynes", Mimeo, June.

BALL, P., 2012, "Why Society is a Complex Matter", Springer-Verlag, Berlin and Heidelberg.

BANK FOR INTERNATIONAL SETTLEMENTS, 2010, *Annual Report*, Chapter 6, Basel, July, www.bis.org/publ/arpdf/ar2010e6.pdf.

BARRELL, R., DAVIS, E.P., KARIM, D. and LAIDZE, I., 2010, "Calibrating Macro prudential Policy", NIESR and Brunel University, 10 September.

BECKWORTH, D., 2008, "Aggregate Supply Driven Deflation and Its Implications for Macroeconomic Stability", *Cato journal*, Vol. 28, No. 3, Autumn.

BERK, J.M. and KNOT, K.H.W., 2001, "Testing for Long Horizon UIP Using PPP-based Exchange Rate Expectations", *Journal of Banking and Finance* 25, pp. 377-391.

BLANCHARD, O., DELL'ARICCIA, G. and MAURO, P., 2010, "Rethinking Macroeconomic Policy", *IMF Staff Position Note* 10/03, Washington, 12 February.

BLANCHARD, O., 2000, "What do we Know about Macroeconomics that Fisher and Wicksell Did Not?", *NBER Working Paper* 7550, Cambridge Mass., February.

BLANCHARD, O. and LEIGH, D., 2013, "Growth Forecast Errors and Fiscal Multipliers", *IMF Working Paper* 13/1, Washington, January.

BLINDER, A., 1995, "Central Banking in Theory and Practice", *The Marshall Lectures*, Cambridge UK.

BLINDER, A.S. and REIS, R., 2005, "Understanding the Greenspan Standard" Prepared for the Symposium "The Greenspan Era: Lessons for the Future" Sponsored by the Federal Reserve Bank of Kansas City, Jackson Hole Wyoming 4 August.

BORDO, M.D., 2008, "History of Monetary Policy" in *The New Palgrave Dictionary of Economics*, Edited by S.N. DURLAUF and L.E. BLUME, Second Edition, Volume 5.

BORIO, C.E.V. and DREHMANN, M., 2009, "Towards an Operational Framework for Financial Stability: Fuzzy Measurement and its Consequences", *BIS Working Paper* 284, Basel, June.

BORIO, C. and LOWE, P., 2002, "Asset Prices, Financial and Monetary Stability: Exploring the Nexus", *BIS Working Paper* 114, Basel, July.

BORIO, C., DISYATAT, P. and JUSELIUS, M., 2013, "Rethinking potential output: embedding information about the financial cycle", *BIS Working paper* 404, Basel, February.

BORIO, C. and SHIM, I., 2007, "What can (macro) prudential policy do to support monetary policy?", *BIS Working paper* 242, Basel, December.

BORIO, C.E.V. and WHITE, W.R., 2003, "Whither Monetary and Financial Stability: the Implications of Evolving Policy Regimes?" – Presentation at the Symposium "Monetary Policy and Uncertainty: Adapting to a changing Economy" Sponsored by the Federal Reserve Bank of Kansas City, Jackson Hole, Wyoming, August.

BORIO, C., 2012, "The Financial cycle and Macroeconomics: What Have We Learnt?", *BIS Working Paper* 395, Basel, December.

BRAINARD, W., 1967, "Uncertainty and the Effectiveness of Policy", *American Economic Review* 57, pp. 411-425.v.

BRUNNER, K. and MELTZER, A., 1969, "The Nature of the Policy Problem" in K. BRUNNER (Ed.), *Targets and Indicators of Monetary Policy*", Chandler, San Francisco.

CAGLIARINI, A., KENT, C. and STEVENS, G., 2010, "Fifty Years of Monetary Policy: What Have we Learned", Presentation at 50th Anniversary Symposium of the Reserve Bank of Australia, Sydney, 9 February.

CAPIE, F., 2013, "Can Central Bank Independence Survive Crises?", *Paper presented at the 41st Economics Conference of the Austrian National Bank*, Vienna, 10 June.

CECCHETTI, S., FENDER, I. and MCGUIRE, P., 2010, "Towards a Global Risk Map", *BIS Working Paper* 309, Basel, May.

CGFS, 2010, "Macroprudential Instruments and Frameworks: A Stocktaking of Issues and Experiences", *CGFS Paper* 38, Basel, May.

CGFS, 2012, "Operationalizing the Selection and Application of Macroprudential Instruments", *CGFS Paper* 48, Basel.

CLAESSENS, C., POZSAR, Z., RATNOVSKI, L. and SINGH, M., 2012, "Shadow Banking: Economics and Policy", *IMF Staff Discussion Note* 4 December.

CLARIDA, R., GALI, J. and GERTLER, M., 1999, "The Science of Monetary Policy: A New Keynesian Perspective", *Journal of Economic Literature*, Vol. 37, No. 4, December, pp. 1661-1707.

COMMITTEE ON INTERNATIONAL ECONOMIC POLICY AND REFORM, 2011, *Rethinking Central Banking*, Brookings Institution, Washington.

CROW, J., 1993, "Monetary Policy and the Responsibilities and Accountabilities of Central Banks", *Gerhard de Kock Memorial Lecture*, University of Pretoria, Pretoria, February.

DAVIES, G., 2002, "A History of Money from Ancient Times to the Present Day", 3rd ed., University of Wales Press, Cardiff.

DEBELLE, G. and FISCHER, S., 1994, "How Independent Should a Central Bank Be?" in J.C. FUHRER (Ed.), *Goals, Guidelines and Constraints Facing Monetary Policymakers*, Federal Reserve Bank of Boston, 195-221.

FAHR, S., MOTTO, R., ROSTAGNO, M., SMETS, F. and TRISTANI, O., 2011, "Lessons for Monetary Strategies from the Recent past" in *Approaches to Monetary Policy Revisited: Lessons from the Crisis*, European Central Bank, Frankfurt am Main, July.

FINANCIAL STABILITY BOARD, 2012, "The Financial Crisis and Information Gaps", Staff of the IMF and Financial Stability Board, Washington and Basel, September.

FISCHER, S., 2001, "Exchange Rate Regimes: Is the Bipolar View Correct?", *Journal of Economic Perspectives*, 15(2): 3-24.

FLEMING, J.M., 1962, "Domestic financial policies under fixed and floating exchange rates", *IMF Staff Papers* 9: 369-379, reprinted in COOPER, RICHARD, N. (Ed.), 1969, International Finance, New York, Penguin Books.

FRATZSCHER, M., LO DUCA, M. and STRAUB, R., 2012, "Quantitative easing, Portfolio Choice and International Capital Flows", *Draft*, European Central Bank, Frankfurt, 22 February.

FRIEDMAN, M., 1959, "A Program for Monetary Stability", Fordham University Press, New York.

FRIEDMAN, M., 1956, "The Quantity Theory of Money: a Restatement" in *Studies in the Quantity Theory of Money*, University of Chicago Press, Chicago.

FRIEDMAN, M., 1953, "The Case for Flexible Exchange Rates" in *Essays in Positive Economics*, Chicago, University of Chicago Press, pp. 157-203.

FRIEDMAN, M., 1968, "The Role of Monetary Policy", *American Economic Review* 58(1) March, pp. 1-17.

FRYDMAN, R. and GOLDBERG, M.D., 2011, "Beyond Mechanical Markets", Princeton University Press, Princeton and Oxford.

FUNIBASHI, Y., 1988, "Managing the Dollar: From the Plaza to the Louvre", Institute for International Economics, Washington.

GALATI, G. and MOESNER, R., 2011, "Macroprudential Policy – a Literature Review", *BIS Working Paper* 337, Basel, February.

GALATI, G. and MELICK, W., 2006, "The Evolving Inflation Process", *BIS Working Paper* 196, Basel, February.

GHOSH, A.R., GULDE, A.-M. and WOLF, H.C., 2000, "Currency Boards: More Than a Quick Fix?", *Economic Policy*, Vol. 15, Issue 31, October.

GOODHART, C.A.E., 2010, "The Changing Role of Central Banks", *Presentation at the Annual BIS Research Conference*, Luzern, 24 June.

GORTON, G.B. and METRICK, A., 2010, "Regulating the Shadow Banking System", *Brookings Papers on Economic Activity*, Fall, 2010, pp. 261-97.

GRIM, R., 2009, "How the Federal Reserve Bought the Economics Profession", *Huffington Post*, 23 October.

HABERLER, G., 1984, "Reflections on Hayek's business cycle theory", *Cato Journal*, Vol. 6, Autumn.

HABERLER, G., 1939, "Prosperity and Depression", *League of Nations*, Geneva.

HALL, T.E. and HART, W.R., 2010, "The Samuelson-Solow Phillips Curve and the Great Inflation", Miami University Department of Economics, *Working paper* 2010.08, October.

HANKE, S. and SCHULER, K., 1994, "Currency Boards for Developing Countries: a Handbook", ICS Press, San Francisco.

HANNOUN, H., 2012, "Monetary Policy in the Crisis: Testing the Limits of Monetary Policy", Speech delivered at the 47th SEACEN Governor's Conference, Seoul, Korea, 13-14 February.

HARING, N. and DOUGLAS, N., 2012, "Economists and the Powerful", Anthem Press, London.

HAYEK, F.A., 1979, "The Counter-Revolution of Science: Studies in the Abuse of Reason", Liberty Press, Indianapolis.

HAYEK, F.A., 1944, "The Road to Serfdom", George Routledge and Sons, London and New York.

HICKS, J., 1977, "Economic perspectives: Further Essays on Money and Growth", Clarendon Press.

HICKS, J.M., 1937, "Mr. Keynes and the Classics: a Suggested Interpretation", *Econometrica* Volume 5, Issue 2, April, pp. 147-169.

INTERNATIONAL MONETARY FUND, 2012, "The Liberalisation and Management of Capital Flows: an Institutional View", Washington, 14 November.

INTERNATIONAL MONETARY FUND, 2013, "The interaction of monetary and macroprudential policies", Washington, 29 January.

ISSING COMMITTEE, 2009, "New Financial order – Recommendations by the Issing Committee", February.

ISSING, O., 2013, "A New Paradigm for Monetary Policy?", *Centre for Financial Studies Working Paper No 2*, Frankfurt.

JAMES, H., 2012, *Making the European Monetary Union*, The Belknap Press of Harvard University, Cambridge Mass.

JORDA, O., SCHULARICK, M. and TAYLOR, A.M., 2012, "When credit bites back: leverage, business cycles and crises", Paper prepared for a conference on

"Debit and Credit Growth and Crises" hosted by the World Bank and the Bank of Spain, Madrid 18-19 June.

KEEN, S., 1995, "Finance and Economic Breakdown: Modeling Minsky's 'Financial Instability Hypothesis'", *Journal of Post Keynesian Economics*, 17(4), 607-35.

KEYNES, J.M., 1923, *A Tract on Monetary Reform*, Macmillan and Company, London.

KOO, R., 2003, *Balance Sheet recession*, John Wiley and Son. Singapore.

KREGEL, J., 2011, "Was Keynes's Monetary Policy, à Outrance in the Treatise, a Forerunner of ZIRP and QE? Did He Change His Mind in the General Theory?", *Policy Note* 2011/4, Levy Economics Institute of Bard College.

KUHN, T., 1962, *The Structure of Scientific Revolutions,* University of Chicago Press.

KYDLAND, F.E. and PRESCOTT, E.C., 1977, "Rules Rather than Discretion: the Inconsistency of Optimal Planning", *Journal of political Economy* Vol. 5, Issue 3, June, pp. 473-492.

LAIDLER, D., 2007a, "Successes and Failures of Monetary Policy since the 1950s", University of Western Ontario, *Working Papers* 2007-2, October.

LAIDLER, D., 2007b, "Financial Stability, Monetarism and the Wicksell Connection", *University of Western Ontario Working Paper* 2007-3, October.

LAIDLER, D., 2009, *Lucas, Keynes and the Crisis*, Mimeo, July.

LEESON, R., 2000, "Inflation, Disinflation and the Natural Rate of Unemployment: A Dynamic Framework for Policy Analysis" , *The Australian Economy in the 1990s*, edited by D. GRUEN and S. SHRESTHA, Reserve Bank of Australia Sydney, July.

LEIJONHUFVUD, A., 1968, *On Keynesian Economics and the Economics of Keynes*, Oxford University Press, New York

LEIJONHUFVUD, A., 2009, "Out of the Corridor: Keynes and the Crisis", *Cambridge Journal of Economics* 33, pp. 741-757.

LUCAS, R.E., 1980, "Methods and Problems in Business Cycle Theory", *Journal of Money*, Credit and Banking, Vol. 12, No. 4, Part 2, November.

MANKIW, N.G., 1988, "Recent Developments in Macroeconomics: A Very Quick Refresher Course", *Journal of Money, Credit and Banking*, Vol. 20, No. 3, August.

MCCLOSKEY, D., 1985, "The Rhetoric of Economics", University of Wisconsin Press, Madison, Wisconsin.

MELTZER, A., 2009a, "A History of the Federal Reserve, Vol. 2, Book 1: 1951-1969", University of Chicago Press, Chicago.

MELTZER, A., 2009b, "A History of the Federal Reserve, Vol. 2, Book 2; 1970-1986" University of Chicago Press, Chicago.

MINSKY, H., 2008, *Stabilising an Unstable Economy*, McGraw Hill, New York.

MISHKIN, F.S., 2011, "Monetary Policy Strategy: Lessons from the Crisis" in *Approaches to Monetary Policy Revisited- Lessons from the Crisis*, Sixth ECB Central Banking Conference, European Central Bank, Frankfurt.

MISHKIN, F.S., 2009, "Will Monetary Policy Become More of a Science?" in DEUTSCHE BUNDESBANK (Ed.), *Monetary Policy Over Fifty Years: Experiences and Lessons*, Routledge, London 2009, pp. 81-107. Reprinted in WIELAND, V., (Ed.), *The Science and Practice of Monetary Policy Today*, Springer-Verlag, Berlin, 2010, pp. 81-103.

MORENO, R., 2011, "Policymaking from a Macroprudential Perspective in Emerging Market Economies", *BIS Working Paper* 336, Basel, January.

MORLEY, J., 2010, "The Emperor has No Clothes", *Macroeconomic Advisors Macro Focus*, Vol. 5, No. 2, 24 June.

MUNDELL, R.A., 1963, "Capital mobility and stabilization policy under fixed and flexible exchange rates", *Canadian Journal of Economic and Political Science* 29 (4): 475-485, doi:10.2307/139336. Reprinted in MUNDELL, R.A., 1968, *International Economics*, New York, Macmillan.

MURRAY, J. and KHEMANI, R., 1989, "International Interest Rate Linkages and Monetary Policy: a Canadian Perspective", *Bank of Canada Technical Report* 52.

NELSON, E., 2012, "A Review of Allen Meltzer's A History of the Federal Reserve, Volume 2", *International Journal of Central Banking*, June.

OECD, 2013, "Aid for Trade at a Glance: Connecting to Value Chains", Paris, 8 July.

ORPHANIDES, A., 2001, "Monetary Policy Rules Based on Real Time Data", *American Economic Review* 91, pp. 964-985.

PHELPS, E.S., 1968, "Money-Wage Dynamics and Labour-Market Equilibrium", *Journal of Political Economy*, Chicago University Press 76, pp. 678-711.

PHILLIPS, A.W., 1958, "The Relation Between Unemployment and the Rate of Change of Money Wage Rates in the United Kingdom, 1861 to 1957". *Economica* 25 (100): 283-299.

POOLE, W., 1970, "Optimal Choice of Monetary Policy Instruments in a Simple Stochastic Macromodel", *Quarterly Journal of Economics*, 84, 197-216.

POOLE, W., 2012, "Monetary Policy Flexibility: Solution or Problem" in *Challenges to Central Banking in the Context of the Financial Crisis*, Edited by S. GOKARN, Reserve Bank of India and Academic Foundation, New Delhi.

POPPER, K., 1972, "Objective Knowledge. An Evolutionary Approach", Oxford University Press.

PRINGLE, R., 2012, "The Money Trap", Palgrave Macmillan, Basingstoke Hampshire.

REINHART, C. and REINHART, V., 2010, "After the Fall", Presentation at the Symposium "Macroeconomic Challenges: the Decade Ahead", Sponsored by the Federal Reserve Bank of Kansas City, Jackson Hole, Wyoming, August.

REINHART, C. and ROGOFF, K.S., 2009, "This Time is Different: Eight Centuries of Financial Folly", Princeton University Press, Princeton NJ.

REINHART, C.M. and SBRANCIA, M.B., 2011, "The liquidation of government debt", *NBER Working Paper* 16893, Cambridge Mass., March.

ROBINSON, J., 1962, "Review of Johnson", *Economic Journal* 72:690-692.

ROGER, S. and VLCEK, J., 2011, "Macrofinancial modeling at Central Banks: Recent developments and Future Directions", *IMF Working Paper* 12/21 Washington, January.

ROMER, C.D. and ROMER, D.H., 2002, "The Evolution of Economic Understanding and Post war Stabilisation Policy" in *"Rethinking Stabilisation Policy"*, Sponsored by the Federal Reserve Bank of Kansas City, Jackson Hole Wyoming, August.

SAMUELSON, P.A. and SOLOW, R.M., 1960, "Analytical Aspects of Anti-Inflation Policy", *American Economic Review papers and proceedings* 50(2), pp. 177-194.

SARGENT, T.J. and WALLACE, N., 1975, "Rational Expectations, the Optimal Monetary Instrument and the Optimal Money Supply Rule", *Journal of Political Economy*, Vol. 83, No. 2.

SCHULARICK, M. and TAYLOR, A.M., 2009, "Credit Booms Gone Bust: Monetary Policy, Leverage Cycles and Financial Crises 1870-2008", *NBER Working Paper* Series No. 15512, Cambridge Mass.

SELGIN, G., 1997, "Less than Zero: the Case for a Falling Price Level in a Growing Economy", *IEA Hobart Paper* No. 132, London.

SELODY, J., 1990, "The Goal of Price Stability: A Review of the Issues", *Bank of Canada Technical Report* 54, Ottawa.

SIKLOS, P.L., 2007, "Revisiting the Coyne Affair: A Singular Event that Changed the Course of Canadian Monetary History", Wilfred Laurier University, Draft, February.

SILBER, W.L., 2012, *Volcker*, Bloomsbury Press, New York.

TAYLOR, J., 2010, "Rethinking Monetary Policy in Light of the Crisis" in *Macroeconomic challenges: the decade ahead*, Symposium sponsored by the Federal Reserve Bank of Kansas City, Jackson Hole Wyoming.

TURNER, A., 2013, "Debt, Money and Mephistopheles: How Do We Get Out of This Mess", Lecture at Cass Business School, London, 6 February.

VIKOREN, B., 2013, "On Financial Imbalances and Monetary Policy" Presentation at the Soria Moria Hotel, Oslo, 2 February.

WHITE, W.R., 2006, "Is Price Stability Enough", *BIS Working Paper* 205, Basel, April.

WHITE, W.R., 2008, "Globalisation and the Determinants of Domestic Inflation", *BIS Working Paper* 250, Basel, March.

WHITE, W.R., 2009, "Should Monetary Policy Lean or Clean", Federal Reserve Bank of Dallas, Globalisation and Monetary Policy Institute, *Working paper* 34, Dallas, August.

WHITE, W.R., 2010, "The Mayekawa Lecture: Some Alternative Perspectives on Macroeconomic Theory and Some Policy Implications", Monetary and Economic Studies, Institute for Monetary and Economic Studies, Bank of Japan, Vol. 28, November.

WHITE, W.R., 2011, "Why all Central Banks are Not the Same" in *Challenges to Central Banking in the Context of Financial Crisis*, Edited by S. Gorkan, Reserve Bank of India and Academic Foundation.

WHITE, W.R., 2012, "Ultra Easy Monetary Policy and the Law of Unintended Consequences", Federal Reserve Bank of Dallas, Globalisation and Monetary Policy Institute, *Working Paper* 126, Dallas.

WHITE, W.R., 2013, "Overt Monetary Financing and Crisis Management", www.project-syndicate.org, 12 June.

WOODFORD, M., 2013, "Accommodation at the Zero Lower Bound" in *The Changing Policy Landscape*, Symposium sponsored by the Federal Reserve Bank of Kansas City, Jackson Hole, Wyoming, August.

YAMAGUCHI, Y., 1999, "Asset Prices and Monetary Policy: Japan's Experience" in *New Challenges for Monetary Policy*, Symposium sponsored by the Federal Reserve Bank of Kansas City, Jackson Hole, Wyoming, August.

4. Unconventional Monetary Policy of the ECB during the Financial Crisis: An Assessment and New Evidence

Christiaan Pattipeilohy, Jan Willem van den End, Mostafa Tabbae, Jon Frost & Jakob de Haan

Abstract

We first sketch how central banks have used unconventional monetary policy measures by using three indicators based on the composition of the balance sheet of eleven central banks. Our analysis suggests that although the ECB's balance sheet has increased dramatically during the crisis, the non-standard monetary policy measures had only a moderate impact on the composition of the ECB's balance sheet compared to other central banks, such as the Fed and the Bank of England. Next, we take stock of research analysing the effects of unconventional monetary policy of the ECB after the onset of the crisis. A crucial question is to what extent these measures have been able to affect interest rates, thereby restoring the monetary policy transmission process and supporting the central bank objectives. Finally, we offer new evidence on the effectiveness of the ECB's unconventional monetary policy measures, i.e. extended liquidity provision (LTRO) and the Securities Market Programme (SMP). Our results suggest that the LTRO interventions in general had a favorable (short-term) effect on government bond yields. Changes in the SMP only had a visible downward effect on bond yields in Summer 2011, when the program was reactivated for Italy and Spain, but this effect dissipated within a few weeks.

4.1. Introduction

Several central banks in industrialised countries have broadened their assortment of monetary policy instruments over the past few years. These so-called unconventional monetary policy measures were taken as more conventional measures had (largely) lost their potency. As pointed out by Borio and Disyatat (2010), the distinguishing feature of these measures is that the central bank actively uses its balance sheet to affect market prices and conditions beyond a short-term interest rate. For instance, after the Federal Open Market Committee (FOMC) had lowered the target for the federal funds rate to a range of 0 to 25 basis points in December 2008, US policymakers faced the challenge of how to further ease the stance of monetary policy as the economic outlook deteriorated. The Federal Reserve decided to purchase substantial quantities of assets with medium and long maturities in an effort to drive down private (long-term) borrowing rates.

Other central banks took similar and other measures. For instance, recently the European Central Bank (ECB) announced a new program of outright monetary transactions (OMTs). The program involves discretionary sterilized purchases of short-term sovereign bonds under certain conditions and is subject to a prior request by the respective country's government for international assistance via the European Financial Stability Facility/European Stability Mechanism (EFSF/ESM). Instead of explicitly driving down longer term borrowing rates, OMTs aim to restore a proper transmission of monetary policy throughout the euro area in case of severe market disruptions.

Unconventional monetary policy frameworks may comprise three elements: (i) large-scale liquidity support to banks; (ii) forward guidance of ultra-low policy rates over extended policy horizons; and (iii) large-scale financial market interventions, in particular huge asset purchases.

According to Hannoun (2012), "Large-scale interventions in financial markets aimed at reviving dysfunctional market segments or providing additional monetary stimulus have become routine. We should not underestimate the welcome role such policy actions played in the darkest days of the crisis. They were critical in preventing unfettered financial instability and a potential deflationary spiral. Extraordinary times call for extraordinary measures." However, he also warns that these measures "while justified and understandable as an exceptional response to the crisis, if prolonged, have adverse side effects that are likely to become more harmful the longer the 'medicine' is applied."[1] Likewise, referring to the low interest rate policy of the Fed, Sachs (2012) argues that it "has a risk not acknowledged by the Fed: the creation of another bubble".

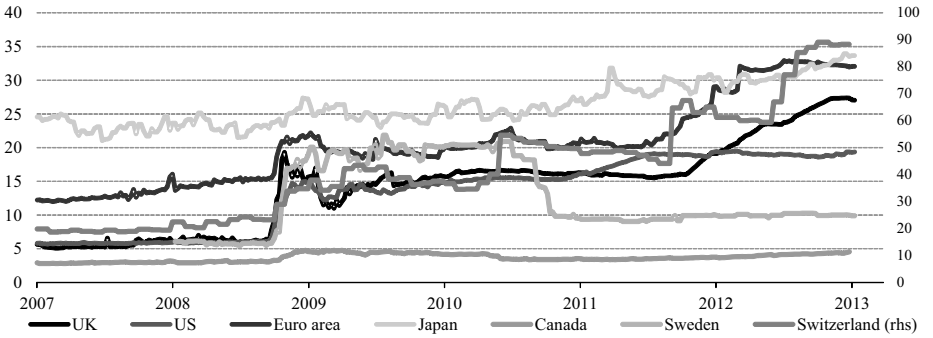
As a consequence of these unconventional measures, central bank balance sheets have expanded substantially. In advanced economies, central bank assets now exceed 20% of GDP (Figure 4.1; see also Hannoun (2012))[2]. Moreover, unconventional monetary policies have led to significant changes in terms of balance sheet composition as is shown in Figure 4.2 (see Borio and Disyatat (2010) and Lenza *et al.* (2010) for further discussion). Unfortunately, given the different reporting methodologies by central banks on their balance sheets, the overview in Figure 4.2 does not allow us to make a more quantitative comparison of compositional changes in the balance sheets of different central banks.

In this chapter, after first briefly discussing conventional monetary policies, we will present an indicator-based methodology which does allow us to make such a

[1] Negative side effects mentioned by Hannoun (2012) include: delaying balance sheet adjustments in the economy; the risk of encouraging a new round of risk-taking and leveraging in the financial system; concern that financial markets lose their capacity to discover prices; too dominant a role on the part of central banks in market-making could contribute to an atrophy of markets; and the longer the policies are in place, the harder the exit is likely to be.

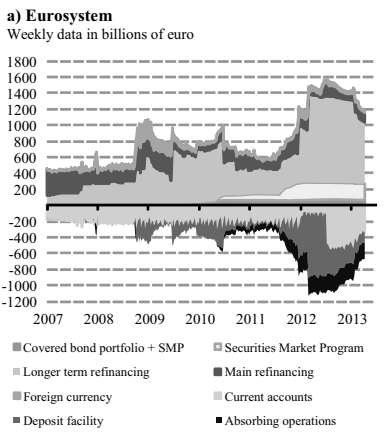
[2] Total of the euro area, Canada, Japan, Sweden, Switzerland, the United Kingdom and United States.

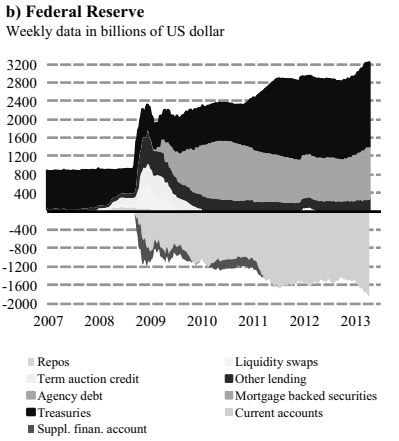
Figure 4.1: Central Bank Assets as a percentage of GDP*

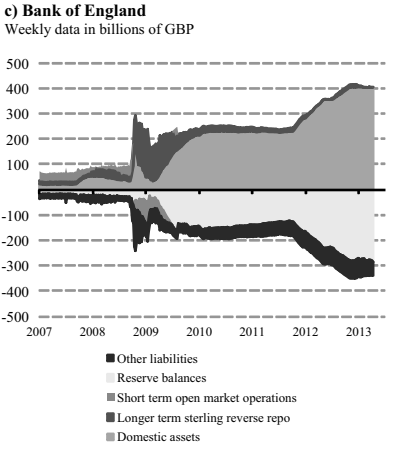


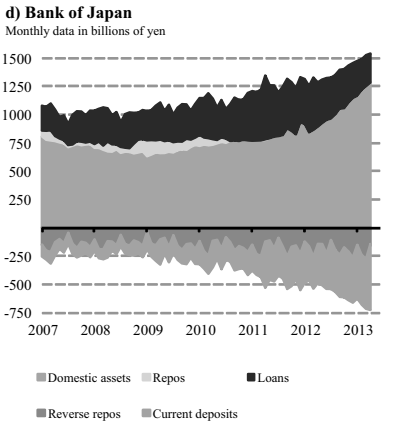
* Nominal GDP in 2011

Figure 4.2: Central Bank Balance Sheets









comparison. The indicators have been calculated for central banks in several OECD countries: Australia, Canada, the euro area, Japan, Korea, Norway, Switzerland, Turkey, the UK, and the US. With these indicators we are able to quantify the scope of quantitative easing monetary policy measures, as well as the scale of qualitative easing. The indicators can be used to compare countries and to assess developments over time, while taking into account differences in starting positions in monetary policy frameworks. Our analysis suggests that while the ECB's balance sheet has increased dramatically during the crisis (both in nominal terms and as a percentage of GDP), the non-standard monetary policy measures had only a moderate impact on the composition of the ECB's balance sheet compared to other central banks such as the Fed and the Bank of England.

Next, we take stock of research analysing the effects of unconventional monetary policy of the ECB after the onset of the crisis[3]. A crucial question is to what extent these measures have been able to affect interest rates, thereby restoring the monetary policy transmission process and supporting the central bank objectives. We will discuss several recent studies addressing this question. An important element to investigate is related to the transmission channel of unconventional balance sheet policies. One channel could be through interest rate expectations, meaning that balance sheet policies represent a substitute to standard interest rate policy and contribute to forward guidance as in the New Keynesian framework. Another potential transmission channel could be through a portfolio-rebalancing effect. This would imply that balance sheet policies are complementary to standard interest rate policy in a Tobin preferred-habitat fashion. An answer to the question of which transmission channel dominates in practice could also provide an answer to the question of whether unconventional balance sheet policies are to be expected to remain part of the future standard monetary policy toolkit. A final question that will be touched upon is to what extent the (announcement) effects of asset purchase programs have waned over time.

The final part of the chapter provides new evidence on the effectiveness of the ECB's unconventional monetary policy measures, both extended liquidity provision and the Securities Market Programme (SMP). Under this programme, interventions were carried out in the euro area public and private debt securities markets to ensure depth and liquidity in dysfunctional market segments and to restore the proper functioning of the monetary policy transmission mechanism. Purchases of government bonds were strictly limited to secondary markets. To ensure that liquidity conditions are not affected, all purchases were fully neutralised through liquidity-absorbing operations. Using market data on bond yields, CDS spreads, money market spreads, stock price indices, exchange rates

[3] For (reviews of the) evidence referring to other central banks, we refer to IMF (2009), Kluyev *et al.* (2009), Stone *et al.* (2011) and Kozicki *et al.* (2011).

and volatility indicators, we seek to tease out the impact of policy interventions on yields and calculate "hypothetical yields" without such interventions.

4.2. CONVENTIONAL MONETARY POLICY: AN OVERVIEW

Before zooming in on the ECB's non-conventional monetary policies since the start of the financial crisis in 2007, this section outlines some general developments in monetary policymaking before the crisis. Low and stable inflation became the primary (or even sole) objective of monetary policy of central banks in most industrialized countries[4]. However, the way central banks try to reach this objective differs across countries and has changed over time. Section 4.2.1. provides a broad-brush overview, while Section 4.2.2. zooms in on conventional monetary policies of the ECB.

4.2.1. Inflation as Primary Objective

According to the Mundell-Fleming model, a fixed exchange rate, capital mobility and national monetary policy cannot be achieved at the same time. One of the objectives has to give in. The Bretton Woods regime allowed for capital controls. But over time the effectiveness of capital controls was gradually diminishing. In a regime of a fixed exchange rates and free capital flows, money growth becomes endogenous. After the fall of the Bretton Woods regime, countries that opted for a flexible exchange rate had to decide on their monetary policy strategy. When inflation in several countries reached high levels during the 1970s, several central banks started to pay more attention to money growth, inspired by the monetarist adagio that inflation is always and everywhere a monetary phenomenon[5].

According to Benatti and Goodhart (2010, p. 1178), the episode 1979-82 came to be known amongst central bankers under the general title of 'Practical Monetarism', characterised by:

> *"a) a belief in the medium and longer term reliability of the relationship between monetary growth and nominal incomes/inflation;*
> *b) a belief that velocity (demand for money) functions were sufficiently predictable/stable to act as 'intermediate targets';*
> *c) a belief that interest rate elasticities were such as to allow appropriate adjustments in both expenditure functions and monetary aggregates;*
> *d) a deep hostility to monetary base control methods."*

[4] The US is a clear exception in view of the "dual mandate" of the Fed for "maximum employment, stable prices and moderate long-term interest rates" (Federal Reserve Act, as amended in 1977).

[5] Classic references include Friedman (1968), Johnson (1971) and Brunner and Melzer (1993).

The monetary policy strategy of central banks should be considered against the background of their mandates. In the US, the "monetarist experiment" began in October 1979, when the FOMC under Chairman Paul Volcker adopted an operating procedure based on the management of non-borrowed reserves. "The intent was to focus policy on controlling the growth of M1 and M2 and thereby to reduce inflation, which had been running at double-digit rates. As you know, the disinflation effort was successful and ushered in the low-inflation regime that the United States has enjoyed since. However, the Federal Reserve discontinued the procedure based on non-borrowed reserves in 1982. It would be fair to say that monetary and credit aggregates have not played a central role in the formulation of U.S. monetary policy since that time, although policymakers continue to use monetary data as a source of information about the state of the economy." (Bernanke (2006)). As Bernanke points out, the reason that the Fed stopped relying on monetary aggregates is that in the United States, deregulation, financial innovation, and other factors have led to recurrent instability in the relationships between various monetary aggregates and inflation. Attempts to find stable relationships between M1 growth and growth in other nominal quantities were unsuccessful, and formal growth rate targets for M1 were discontinued in 1987. Similar problems showed up with broader aggregates, such as M2. The FOMC decided to discontinue setting target ranges for M2 and other aggregates after the statutory requirement for reporting such ranges lapsed in 2000. In continental Europe, the situation was very different. The Bundesbank, having a single mandate for price stability, introduced a policy of monetary targeting in 1974 which was widely considered to be very successful, even though the targets were frequently missed[6]. According to Beyer *et al.* (2009, pp. 19-20), there "were two main arguments in favour of providing a quantified guidepost for the future rate of monetary expansion. First and foremost was the intention of controlling inflation through the control of monetary expansion. Second, the Bundesbank tried to provide guidance to agents' (especially wage bargainers') expectations through the announcement of a quantified objective for monetary growth.

Although the formulation of the new strategy was heavily influenced by the ideas of the leading monetarists, the implementation of monetary targeting in Germany deviated from the theoretical blueprint in a number of ways. One important difference was that [the] Bundesbank did not formulate its targets in terms of the monetary base, but in terms of a broadly defined monetary aggregate, the central bank money stock (defined as currency in circulation plus the required minimum reserves on domestic deposits calculated at constant reserve ratios with base January 1974). Secondly, the Bundesbank did not attempt to control the money

[6] In the period 1960-1998, average inflation in Germany was 3.1 per cent per year, which was far below inflation in other G7 countries. Only Switzerland came close with an average inflation rate of 3.3 per cent (Breyer *et al.*, 2009).

stock directly, but followed an indirect approach of influencing money demand by varying key money market rates and bank reserves (two-stage implementation procedure). Thirdly, the Bundesbank made it clear from the beginning that it could not and would not promise to reach the monetary target with any degree of precision."

Several other European countries pegged their currency to the German Mark (DEM) via the Exchange Rate Mechanism (ERM) of the European Monetary System (EMS). After an initial "turbulent period" (1979-1983), in which there were many rate adjustments, the ERM entered a "calmer" period (1983-1992), in which countries made maintenance of their peg to the DEM the centre-piece of their monetary policy[7]. After 1992 there were serious crises, which boosted the idea to introduce a common currency. Also the fact that the Bundesbank solely determined its policies based on the economic situation in Germany so that several countries faced an interest rate which was frequently not in line with their business cycle position gave impetus to the initiative for a monetary union.

Since 1999, the Governing Council of the ECB is in charge of monetary policy-making in the euro area. The Maastricht Treaty made price stability the ECB's primary objective, but left it to the Governing Council to give a precise meaning to this objective. The primary objective, first specified by the ECB as inflation less than 2 per cent in the euro area, was made more precise in 2003 following an internal evaluation of the ECB's monetary policy strategy. The ECB clarified that it aims for maintaining inflation "below but close to 2 per cent in the euro area in the medium term."

The ECB's monetary policy is based on a "two-pillar" strategy that explicitly pairs the discussion of monetary factors ("monetary analysis") with a broad-based non-monetary analysis of the risks to price stability in the short to medium run ("economic analysis"). According to the ECB (2011, p. 69), "the two-pillar approach is designed to ensure that no relevant information is lost in the assessment of the risks to price stability and that appropriate attention is paid to different perspectives and the cross-checking of information in order to reach an overall judgement on the risks to price stability". The two-pillar approach provides a cross-check of the indications that stem from the shorter term economic analysis with those from the longer term-oriented monetary analysis, which, according to the ECB, ensures that monetary policy does not overlook important information relevant for assessing future inflation trends. By taking policy decisions and evaluating their consequences not only on the basis of the short-term indications stemming from the analysis of economic and financial conditions but also on the basis of money and liquidity considerations, the ECB

[7] See, for instance, Hilbers (1998) for an exposition of monetary policy in the Netherlands.

arguably will not be tempted to take an overly activist course in determining the monetary policy stance (ECB (2011)).

The "economic analysis" focuses on the assessment of current economic and financial developments and the implied short to medium-term risks to price stability. Macroeconomic staff projections play an important role in the economic analysis, although their role is different from that of inflation forecasts in an inflation targeting strategy (see below). The ECB publishes these projections for the euro area four times a year in its Monthly Bulletin. The Governing Council uses them with many other pieces of information to assess the risks to price stability, but it neither assumes responsibility for the projections nor does it use the staff projections as its only tool for organising and communicating its assessment as done under Inflation Targeting.

The so-called "monetary analysis" focuses on a medium to long-term horizon. When the ECB's monetary policy strategy was introduced in 1998, the ECB Governing Council announced a quantitative "reference value" for the annual growth rate of a broad monetary aggregate (M3). This focus on money growth was motivated by the view that inflation in the long run is considered to be a mostly monetary phenomenon. The choice for M3 growth was justified by its perceived favourable empirical properties, especially a relatively stable money demand relationship. Furthermore, M3 growth was shown to exhibit leading indicator properties for future inflation. However, the ECB has always stressed that monetary policy does not react mechanically to deviations of M3 growth from the reference value. Such deviations, however, trigger increased efforts to identify and assess the underlying driving forces. Nowadays, the monetary analysis entails a comprehensive analysis of the liquidity situation, going well beyond M3 growth. For instance, the composition of M3 growth (i.e. the components and sectoral contributions) is extensively analysed.

In contrast to the ECB, several central banks opted for inflation targeting (hereafter, IT). IT was first introduced in 1989 in New Zealand as a monetary policy strategy. Since then, many countries started targeting inflation. By the end of 2009, 31 countries had adopted IT. According to Mishkin and Savastano (2001), IT involves the public announcement of numerical targets for inflation, a strong commitment of the central bank to price stability as a final monetary policy objective, and a high degree of transparency and accountability. The distinctive feature of this strategy is a forward-looking decision-making process known as "inflation-forecast targeting" (Svensson (1997)). It means that the central bank sets its policy instruments in such a way that its inflation forecast (after some time) equals the inflation target. Although in practice different forms of inflation targeting exist, they all have in common a published numerical inflation target and a predefined policy horizon. Central banks using this approach communicate

monetary policy decisions in terms of a reaction to deviations in a forecast for a particular measure of inflation from the inflation target at a particular horizon. The central bank's forecast for inflation is therefore centrepiece both when it comes to decision-making and in communicating to the public. Several central banks of European countries outside the euro area use inflation targeting as their monetary policy strategy. For instance, both the Bank of England and the Riksbank (the central bank of Sweden) apply this strategy.

There is a large body of literature examining the consequences of IT, notably for inflation, which frequently comes to different conclusions[8]. After discussing this literature, Blinder *et al.* (2008, p. 935) conclude that "inflationary expectations appear to be generally well anchored, and inflation forecast errors small, in IT countries. And studies of countries undergoing regime changes suggest a causal link between adopting IT and anchoring inflation expectations. However, cross-sectional comparisons yield more ambiguous results; the choice of the control group is apparently crucial. So communication of an explicit inflation target is surely not the only way to anchor expectations."

No matter what their monetary strategy is, most central banks use two policy instruments: policy interest rates and open market operations. In the next section we will explain the use of the instruments in more detail for the case of the ECB.

4.2.2. ECB Instruments[9]

The ECB provides two *standing facilities*, i.e. the marginal lending facility and the deposit facility. Banks can use these facilities if they need liquidity or if they want to stall liquidity. Both facilities have an overnight maturity and are available to banks on their own initiative. The deposit facility is used for mopping up liquidity from the banks at rates which normally are substantially below market rates. The marginal lending facility provides liquidity to the banks at rates that are usually substantially above market rates.

As the interest rates on the standing facilities are normally substantially higher (for borrowing) or lower (for depositing) than the corresponding money market rate, banks normally only use the standing facilities in the absence of other alternatives. As there are no limits on access to these facilities (except for the collateral requirements of the marginal lending facility), the rate on the marginal lending facility and the rate on the deposit facility normally provide a ceiling and a floor, respectively, for the overnight rate in the inter-bank money market. The standing facilities thus constitute a corridor for the inter-bank money market rate.

[8] Also the literature on the factors that make a switch towards IT more likely yields very diverging results. See Samaryna and de Haan (2013) for a discussion.

[9] This section heavily draws on de Haan *et al.* (2012).

The ECB affects money market interest rates by providing more (or less) liquidity to banks if it wants to decrease (increase) interest rates. It allocates an amount of liquidity that allows banks to fulfil their liquidity needs at a price that is in line with the ECB policy intentions. To manage liquidity in the money market and steer short-term interest rates, it uses *open market operations*, i.e. it buys (or sells) financial assets. If assets are bought from (sold to) a bank, the reserves of that bank at the central bank increase (decrease). These operations are carried out by the National Central Banks (NCBs) in the euro area.

The most important open market operations of the ECB are the main refinancing operations (MROs) and longer-term refinancing operations (LTROs) (see Table 4.1). Lending through open market operations normally takes place in the form of reverse transactions. In these reverse transactions, the central bank buys assets from a bank under a repurchase agreement (i.e. the bank buys the asset back) or grants a loan against assets pledged as collateral. Reverse transactions are therefore temporary open market operations which provide funds for a limited, pre-specified period only. The ECB accepts instruments issued by both private and public debtors as collateral.

Table 4.1: Main monetary policy instruments of the ECB

Monetary policy operations	Liquidity provision	Liquidity absorption	Maturity	Frequency
Open market operations				
Main refinancing operations	Reverse transactions	--	One week	Weekly
Longer term refinancing operations	Reverse transactions	--	Three, six or twelve months	Monthly
Standing facilities				
Marginal lending facility	Reverse transactions	--	Overnight	Access at discretion of counterparties
Deposit facility	--	Deposits	Overnight	Access at discretion of counterparties

Source: ECB (2011)

In addition to the weekly MROs, the ECB also executes regular monthly LTROs with various maturities (e.g. six months or twelve months). These operations are aimed at providing longer-term liquidity to the banking system. After October 2008, the weight of the refinancing operations shifted towards LTROs.

The final instrument that we discuss is the *minimum reserve requirements* imposed on banks. Under the minimum reserve system banks are required to hold compulsory deposits with NCBs. The amount of the required reserves is determined by the size and composition of the liabilities on the balance sheet of the bank concerned. For most liabilities included in the reserve base the reserve ratio is 2 per cent.

The minimum reserve system serves two main purposes: (1) to create sufficient structural demand for central bank credit, and (2) to contribute to the stabilisation of money market interest rates. The minimum reserve system enlarges the structural liquidity shortage of the banking system. The need for banks to hold reserves with the NCBs contributes to increasing the demand for central bank credit which, in turn, makes it easier for the ECB to steer money market rates through regular liquidity-providing operations. Interest rates are stabilized by allowing banks to use averaging provisions, i.e., to comply with reserve requirements on the basis of average daily reserve holdings over the maintenance period. This allows banks to smooth out daily liquidity fluctuations, since transitory reserve imbalances can be offset by opposite reserve imbalances generated within the same maintenance period.

As noted by González-Páramo (2011), the ECB's Governing Council in practice made a clear distinction within its monetary policy framework between decisions on the monetary policy stance and the implementation of these decisions. This 'separation principle' implied that the Governing Council decided separately upon the monetary stance (by deciding on interest rates), while liquidity measures and open market operations were conducive to implementing this stance. This approach allowed the ECB to steer short-term interest rates close to the main policy rate, without risking that fine-tuning liquidity measures would be observed as changes in the stance of monetary policy.

4.3. INDICATORS

As pointed out by Borio and Disyatat (2010), before the financial crisis, monetary policy in most countries was defined exclusively in terms of a short-term interest rate. Under this framework, policymakers announce a desired level of the interest rate, while liquidity management operations ensure that a market "reference rate", typically an overnight rate, tracks the desired interest rate level closely[10]. As the central bank has a monopoly over bank reserves, it can set the quantity and the terms on which reserves are supplied at the margin. Therefore, the central

[10] Only on a few occasions, central banks undertook short-lived liquidity injections to maintain stable systemic liquidity conditions. This happened, for instance, during the Long Term Capital Management (LTCM) crisis, the Y2K transition, and after the terrorist attacks of September 11, 2001.

bank is able to set the opportunity cost ("price") of reserves, the overnight rate, to any desired level. Consequently, monetary policy can be implemented without large changes in the size of the central bank's balance sheet, which will be primarily driven by exogenous (autonomous) factors, such as the demand for cash by the public, government deposits, and reserve requirements.

When this conventional policy had (largely) lost its potency, central banks started affecting broader financial conditions more directly, actively using its balance sheet to that effect. These operations generally result in substantial changes in the size and composition of the central bank's balance sheet. Following Lenza *et al.* (2010), theoretically a distinction can be made between quantitative and qualitative easing. The first entails an expansion of the central bank balance sheet, while it does not alter the composition of the asset side of the balance sheet. So the portfolio of assets held by the central bank is not changed: the share of each asset category in total holdings does not alter substantially and no new asset classes are added to the portfolio. The increase in the monetary base is reflected in an accumulation of central bank reserves. Under qualitative easing, the overall size of the central bank balance sheet is left untouched, but the composition of asset holdings is changed. According to Lenza *et al.* (2010), nonconventional policies consisted mainly of qualitative easing until the failure of Lehman, while thereafter central bank balance sheets expanded strongly (even as the composition of the asset side continued to evolve), implying a combination of both quantitative and qualitative easing.

The size and composition of a central bank balance sheet can therefore be used as an indicator of the aggressiveness of the policy efforts of the monetary authorities. Based on a stylised balance sheet of a central bank (see Table 4.2), some simple balance indicators to characterise monetary policy strategies can be developed. The assets side of the balance sheet of a central bank usually consists of domestic government debt, domestic private sector debt (generally banks) and foreign exchange reserves (including gold). The principal category on the liabilities side is base money (M0), i.e. bank notes (Bn) plus non-cash reserves that banks hold with the central bank (Res).

Using the information on the central bank's balance sheet, we develop three indicators. The first of these is the ratio between domestic government debt and domestic private sector debt (G/L) that shows through which domestic channel a central bank implements its monetary policy. The second indicator is the ratio between domestic assets and foreign exchange reserves [(G+L)/FX] to evaluate the extent to which monetary policy is tuned to the external environment. Finally, on the liabilities side we will have a look at the ratio between bank reserves and bank notes (Res/Bn) as an indicator of the level of bank liquidities (as part of M0).

Table 4.2: Stylised central bank balance sheet

Assets		Liabilities	
Domestic government debt	G	Bank notes	Bn
Domestic private sector debt	L	Reserves	Res
Foreign exchange reserves (including gold)	FX		

The indicators can be used to characterise and classify central banks and their methods of implementing monetary policy along three dimensions. To this end, we have calculated the indicators for eleven central banks in OECD countries. We have collected data from the central banks' annual accounts for 2006 year-end (before the crisis) and end-2011 (during or post crisis).

Figures 4.3 and 4.4 show the three indicators in two dimensions. The vertical axis in each case shows our indicator of the liabilities side of the balance, i.e. Res/Bn (note that axes have logarithmic scales). An upward movement along the vertical axis means that demand deposits held by banks at their respective central bank increase relative to banknotes in circulation[11]. The horizontal axis in Figure 4.3 shows the ratio between government debt and private sector debt (G/L). A central bank operating on the left hand side of the diagram thus holds more private debt, while a central bank on the right hand side of the diagram has more government debt on its balance sheet. Hence, a central bank entering in the left hand side of the diagram may be considered a *bankers' bank*[12], while a central bank entering in the right hand side could be classified as a *monetary financier*[13]. The horizontal axis in Figure 4.4 shows the ratio between domestic debt and foreign exchange reserves, i.e. (G+L)/FX. A central bank operating on the left hand side of the diagram holds a relatively large amount of foreign exchange reserves; such a bank will therefore be classifies as *FX-hoarder.* A central bank active on the right hand side holds mainly domestic debt and will be classified as a *domestic lender-of-last-resort* (which may apply either to domestic banks or domestic governments, as reflected in Figure 4.3).

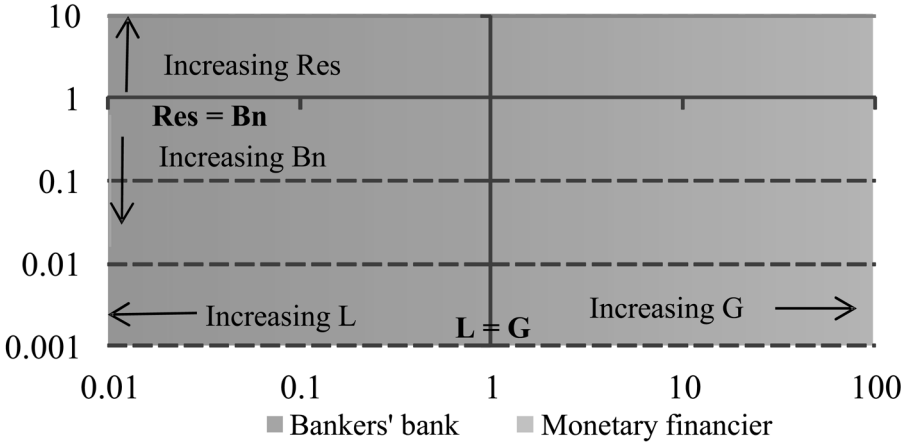
Figures 4.5 and 4.6 show that central banks in 2006 had widely varying starting positions in terms of domestic government debt and domestic private sector debt held. In terms of the terminology of Figures 4.3 and 4.4 one half of the central banks can be classified as bankers' banks, while the other half in fact operates as monetary financier. Their starting positions are also very diversified in terms of

[11] For our purposes this will also include longer term central bank liabilities held by monetary financial institutions, such as fixed term deposits and central bank debt certificates issued.

[12] In principle, private sector debt may also include non-bank debt, e.g. corporate bonds or instruments issued by SPVs.

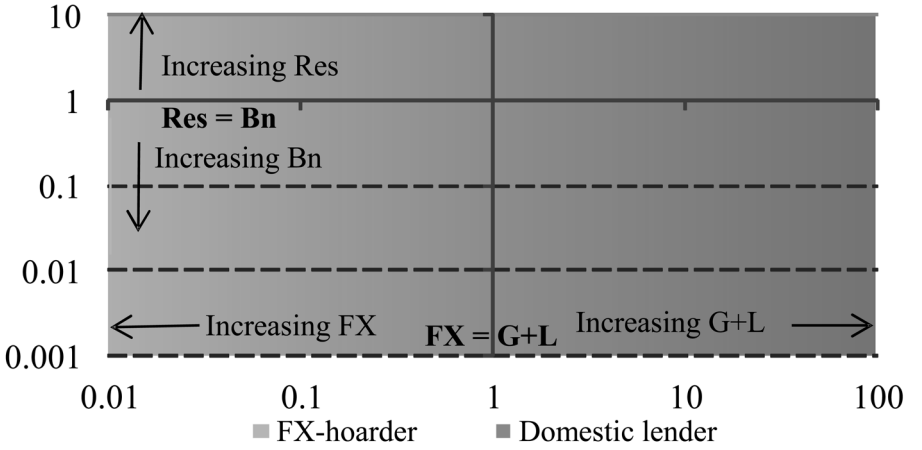
[13] These definitions are for illustrative purposes only and completely unrelated to other similar concepts, e.g. the legal definition of monetary financing as in Article 123 of the Treaty on the Functioning of the European Union.

Figure 4.3: Domestic composition central bank balance sheet
Horizontal axis refers to ratio of domestic public sector debt to domestic private sector debt. Vertical axis refers to ratio of reserves to banknotes.



Note: Log scales. G=domestic public sector debt, L=domestic private sectordebt, Res=bank reserves, Bn=banknotes.

Figure 4.4: International composition central bank balance sheet
Horizontal axis refers to ratio of domestic assets to foreign assets.
Vertical axis refers to the ratio of reserves to banknotes. See also Figure 4.1.



Note: Log scales. G+L=domestic debt, FX=foreign exchange reserves (including gold), Res=bank reserves, Bn=banknotes.

liquidity provision to banks. This is mainly due to diverging reserve requirements. In some regions (e.g. the euro area) reserve requirements apply to a large number of banks, while these are far less relevant in other countries (e.g. the US).

Figure 4.5: Domestic orientation central banks in 2006 and 2011
Horizontal axis refers to the ratio of domestic public sector debt to domestic private sector debt. Vertical axis refers to ratio of reserves to banknotes. See also Figure 4.1.

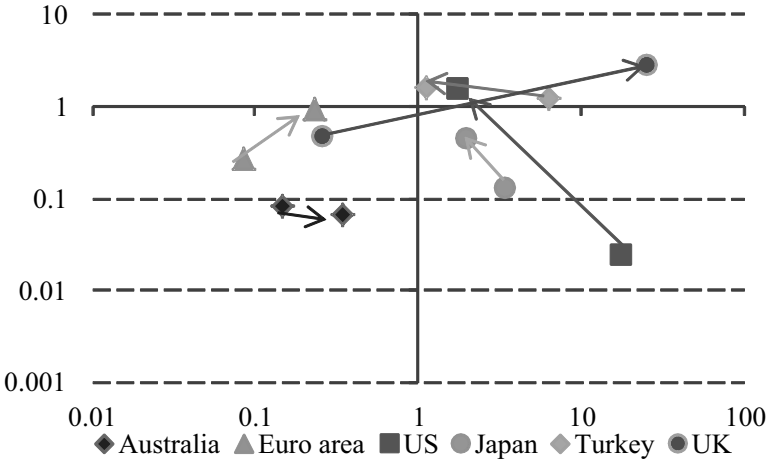
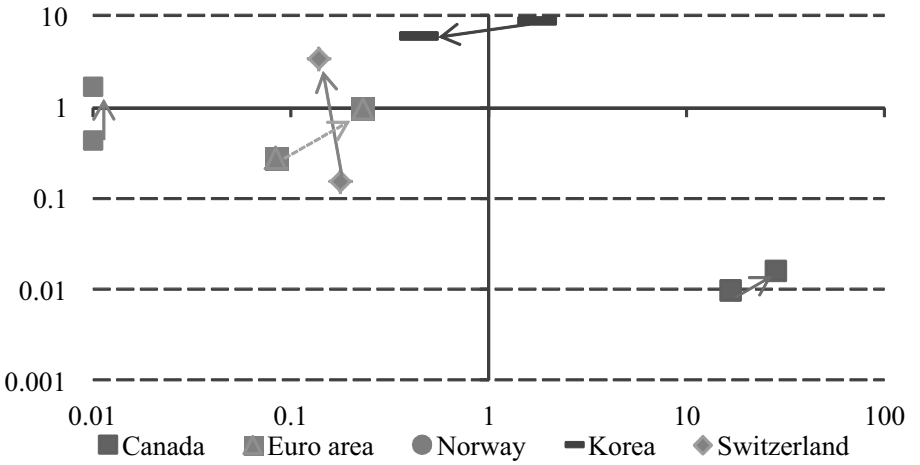


Figure 4.6: Domestic orientation central banks in 2006 and 2011
Horizontal axis refers to the ratio of domestic public sector debt to domestic private sector debt. Vertical axis refers to ratio of reserves to banknotes. See also Figure 4.1.



Note: Observation of G/L for Norway is smaller than 0.01 both in 2006 and 2011

Figures 4.5 and 4.6 also show that between 2006 and 2011 a large number of central banks converged towards each other in terms of the domestic public and private sector debt that they hold. Central banks that used to focus mainly on the bank credit channel increased their exposure to the domestic government and the

other way around. In this process, most central banks converge towards a more balanced ratio between public and private sector debt (L=G). A striking exception is the UK where the ratio between public and private sector debt has overshot much more, causing the Bank of England to change from a bankers' bank into a monetary financier. A reverse trend can be seen in South Korea, although it is much less pronounced. The observed patterns are in line with the different guises of the recent crisis which set in from mid-2007. First, central banks were confronted with a global banking crisis, which led them to expand their lending to banks. This caused a change in balance sheet composition in particular for central banks which had implemented their monetary policy through sovereign debt markets before the crisis (e.g. the Fed, the Bank of Japan and the Central Bank of Turkey). Second, as the crisis was followed by expansionary fiscal policies causing strong increases in sovereign debt levels and – in some cases – upward pressures on interest rates, central banks developed purchasing programmes for sovereign debt. The largest impact in terms of balance sheet composition of the latter development is observed for central banks which did not target sovereign debt markets before (e.g. the ECB, the Bank of England and the Reserve Bank of Australia).

At the same time the provision of liquidity to banks has expanded relative to bank notes in circulation in almost all regions. This means that most central banks do not or hardly sterilise the surplus liquidity resulting from new liquidity provision programmes by reducing other central bank assets. The provision of liquidity to banks expanded most sharply in the US and Switzerland. Australia and South Korea are the exception to the rule as liquidity provision fell off slightly in these two countries.

As Figures 4.7 and 4.8 show, the starting positions of the central banks considered also vary widely in terms of the ratio between domestic and foreign assets. There are a number of central banks holding virtually only domestic assets (Canada, US and Japan). Most other central banks in 2006 had a more balanced position in terms of domestic versus foreign currencies. Norway is an outlier in this respect and in 2006 could be classified as a real foreign exchange hoarder.

Between 2006 and 2011, the ratio between domestic and foreign assets shifted significantly in three countries. Switzerland and South Korea bought up large quantities of foreign currency relative to their domestic assets, while the reverse holds true for the UK[14]. In Switzerland and South Korea this goes hand in hand with efforts to stabilise the exchange rate. The Bank of England has become more inwardly directed since the crisis (mainly government debt). For other central

[14] In South Korea and Norway the change in domestic assets (numerator-effect) contributes almost to the same extent as the change in currency reserves (denominator-effect). The denominator effect dominates in Switzerland, whereas in the UK the numerator effect is more important.

Figure 4.7: Foreign orientation central banks in 2006 and 2011
Horizontal axis refers to the ratio of domestic assets to foreign exchange reserves. Vertical axis refers to ratio of reserves to banknotes. See also Figure 4.2.

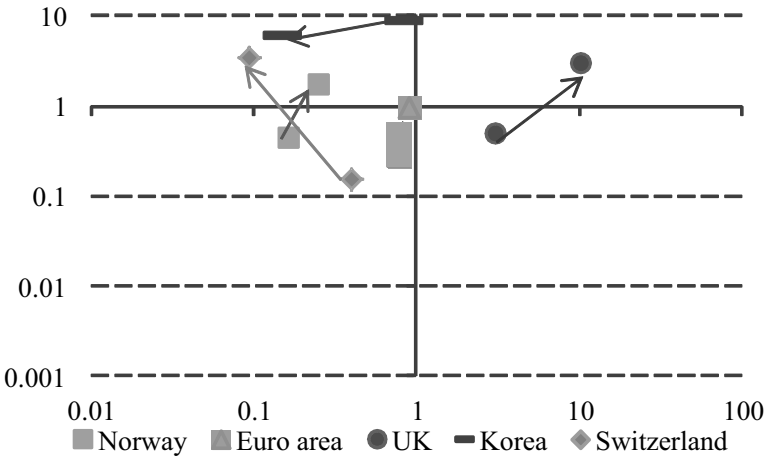
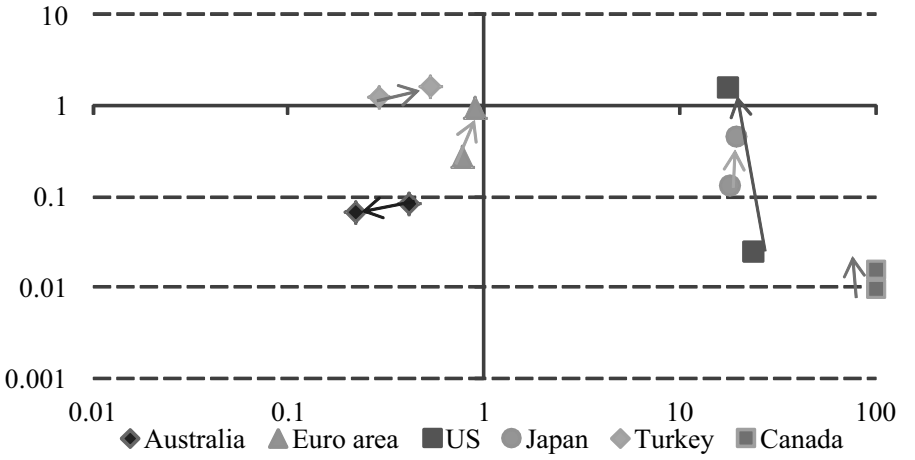


Figure 4.8: Foreign orientation central banks in 2006 and 2011
Horizontal axies refers to the ratio of domestic assets to foreign exchange reserves. Vertical axis refers to ratio of reserves to banknotes. See also Figure 4.2.



Note: Observation of(G+L)/FX for Canada is larger than 100 both in 2006 and 2011.

banks, the ratio between domestic and foreign assets has remained virtually unchanged.

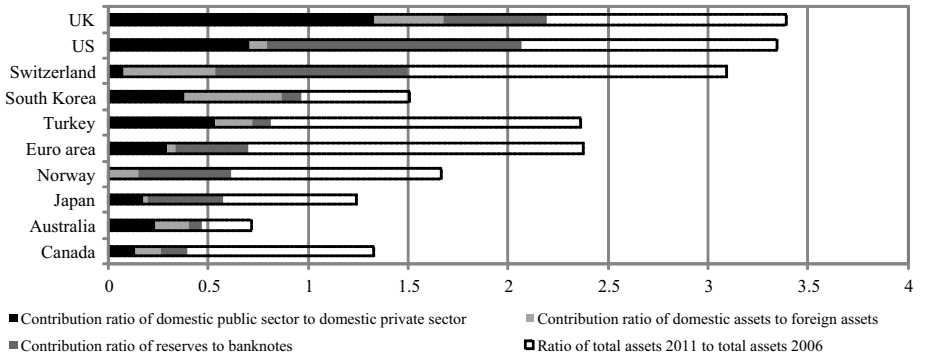
A combined indicator can be used to map out to which extent the measures taken deviate from the regular (pre-crisis) implementation of monetary policy. To this end, we have calculated the distance that central banks cover along the three

indicators[15]. It should be noted that these indicators only depict the distance covered and not the direction they take.

Figure 4.9 shows that central banks that are most aggressive in terms of balance sheet size are not necessarily the most aggressive in terms of composition. The Bank of England, the Fed and the Swiss National Bank are among the most aggressive central banks in terms of composition, for instance, meaning that their interventions are the furthest removed from their regularly employed framework. For the UK the adjustment has mostly taken place in the increased attention for government debt (the black bar). In the US and in Switzerland the strong increase in the provision of liquidity is especially noticeable (the dark grey bar).

Figure 4.9: Measure for change in monetary policy implementation based on composite balance sheet indicator

Distance in [(G+L)/FX - G/L - Res/Bn]- space between end-2006 and end-2011 including contribution per indicator. For reference the ratio of the total central bank assets in 2011 relative to 2006 is also included.



In our framework the ECB takes a more intermediate position. The most important driver in the change in balance sheet composition of the ECB relates to the increase in bank liquidity (the dark grey bar), which refers to the increased intermediary role of the ECB in the interbank market which collapsed in 2008. However, given the fact that the supply of liquidity to banks was already relatively abundant before the crisis, the change in the composition of the ECB's balance sheet is smaller than e.g. the change observed in the composition of the Fed's balance sheet (even though the level of bank reserves relative to banknotes is comparable in 2011). Moreover, the increase in liquidity was achieved to a

[15] We have calculated the length of the vector in the three dimensional [(G+L)/FX – G/L – Res/Bn] space between 2006 and 2011. Under the condition that the value of the indicators is larger than zero and smaller than infinity, a central bank can position itself on every coordinate in the [(G+L)/FX – G/L – Res/Bn]-space. A movement in one dimension can take place independent of movements in the other two dimensions. One single policy measure may, however, have multi-dimensional consequences.

large extent through channels which are traditionally the focus of the ECB's monetary policy, i.e. lending operations to banks. Considering the relatively small amounts of government bonds purchased by the ECB thus far the change in the composition of the ECB's domestic assets (the black bar) has been relatively mild compared to other more aggressive central banks.

4.4. RECENT RESEARCH ON THE ECB'S UNCONVENTIONAL POLICIES: A SURVEY

4.4.1. ECB Policies

In the beginning of the financial crisis, the ECB did not reduce its policy rates. But after the demise of Lehman Brothers it reduced its key interest rates to historically low levels. The main refinancing rate was cut by a total of 325 basis points to 1 per cent between October 2008 and May 2009. In addition, the Governing Council adopted a number of temporary non-standard measures, subsequently referred to as the Enhanced Credit Support, focusing primarily on banks. Due to uncertainty about the creditworthiness of other banks, the inter-bank market did not function properly. After the failure of Lehman Brothers in September 2008 the inter-bank market effectively shut down. Amid significantly impaired markets and elevated counterparty credit concerns, demand for liquidity rose sharply while interbank lending declined rapidly. There are five main building blocks of the Enhanced Credit Support:

(1) Unlimited provision of liquidity through "fixed rate tenders with full allotment" in both the main refinancing operations (MROs) and the long-term refinancing operations (LTROs). Thus, contrary to normal practice, banks had unlimited access to central bank liquidity at the main refinancing rate, subject to adequate collateral.
(2) Extension of the (already long) list of collateral assets, so that the share of private sector assets increased to 56 per cent of the nominal value of securities on the list.
(3) Extension of the maturity of LTROs, initially to six months, and then, in late June 2009, to twelve months, aiming to decrease uncertainty in commercial banks' liquidity planning.
(4) Liquidity provision in foreign currencies, particularly U.S. dollars, through swap lines with the Federal Reserve. This measure supported banks which otherwise faced a massive shortfall in US dollar funding during the financial crisis.
(5) Covered Bonds Purchase Programmes (CBPPs)[16]. The covered bonds market

[16] There were, in fact, two rounds: CBPP which ended in June 2010 and CBPP2 which started in November 2011.

had virtually dried up in terms of liquidity, issuance and spreads. The aim of the programme was to revive the covered bond market, which is a very important financial market in Europe and a primary source of financing for banks. At the end of 2012 the amount outstanding was 68.4 billion euro[17].

Throughout the provision of Enhanced Credit Support the separation principle described in Section 4.2.2. has been maintained by the ECB. Interest rate setting remained conducive to setting the stance of monetary policy, while the special liquidity measures aimed at ensuring the transmission of policy rates through the euro area banking sector and ultimately households and non-financial corporations (González-Páramo (2011)).

On 10 May 2010 the ECB launched the Securities Market Programme (SMP) "to address the severe tensions in certain market segments". The ECB started to intervene in the secondary market of some euro area government bonds in order "to ensure depth and liquidity" and "restore an appropriate monetary policy transmission mechanism". After a first wave of interventions, the programme was re-activated in August 2011, in response to renewed tensions. The primary goal of the SMP was to address a malfunctioning of certain market segments by ensuring sufficient depth and liquidity. It was believed that these severe market tensions, if left untreated, would create unacceptable downside risks to price stability. The decision to establish the SMP was not accompanied by explicit targets in terms of volumes to be purchased or yield levels to be attained. ECB policy-makers emphasised on several occasions that the purpose of the SMP was not to change the monetary policy stance, which continued to be driven by the key policy rates (Manganelli (2012)). The SMP was terminated with the introduction of OMTs (see below). The existing securities in the SMP portfolio will be held to maturity. At the end of 2012 the amount of government securities at the ECB balance sheet due to the SMP was EUR 208.3 billion[18].

In November and December 2011, the ECB Governing Council reduced interest rates in two steps of 25 basis points. The refinancing interest rate came down from 1.50 to 1.00 per cent. These rate cuts were deemed necessary in view of the worsened economic forecasts which indicated increased recession risk. The ECB in addition introduced liquidity-enhancing measures in order to strengthen the liquidity position of European banks. It introduced two LTROs with a maturity of 36 months and the option of early repayment after one year. In December 2011, the ECB lent almost EUR490 billion to banks. In February 2012, the ECB lent almost EUR 530 billion. Whereas the number of banks participating in the first LTRO was 523, in the second LTRO 800 banks asked for and received three-year loans. Banks considered three-year central bank funding at favourable rates

[17] *Source:* www.ecb.int/mopo/implement/omo/html/index.en.html (accessed 27 December 2012).
[18] *Source:* www.ecb.int/mopo/implement/omo/html/index.en.html (assessed 27 December 2012).

as a very attractive way of funding current and new business. In addition to introducing these LTROs, the Governing Council in its December 2011 meeting decided to extend the list of eligible collateral and to temporary reduce the reserve ratio from 2 to 1 per cent.

Finally, on 2 August 2012, the Governing Council of the ECB announced its intention to perform Outright Monetary Transactions (OMTs) in secondary sovereign bond markets that aim at safeguarding an appropriate monetary policy transmission and the singleness of the monetary policy[19]. A necessary condition for OMTs is strict and effective conditionality attached to an appropriate European Financial Stability Facility/European Stability Mechanism (EFSF/ESM) programme. Such programmes can take the form of a full EFSF/ESM macroeconomic adjustment programme or a precautionary programme (Enhanced Conditions Credit Line), provided that they include the possibility of EFSF/ESM primary market purchases. Transactions will be focused on the shorter end of the yield curve, and in particular on sovereign bonds with a maturity of between one and three years. Importantly, no ex ante quantitative limits are set on the size of OMTs. OMTs will be fully sterilized.

4.4.2. Transmission

Several transmission mechanisms of unconventional policies can be identified (Borio and Disyatat (2010); Lenza *et al.* (2010) and Joyce *et al.* (2011)).

First is the signalling channel. Similar to conventional monetary policy (see Blinder *et al.* (2008)), the communication of unconventional policies is an integral part of their transmission mechanism. In the standard New Keynesian framework (*cf.* Eggertsson and Woodford (2003)), the composition of the central bank's balance sheet may only affect the monetary stance and monetary transmission through its signalling effect about the future policy rate. Communication about operations undertaken by the central bank influence public expectations about key factors that underpin an asset's market valuation, such as expectations regarding the future course of policy, relative scarcities of different assets, or their risk and liquidity profiles. Communication may manage expectations of the path of future monetary policy decisions and thus affect the slope of the money market yield curve. Also the announcement that the central bank will engage in operations involving illiquid assets may in itself boost investor confidence in those assets, thereby reducing liquidity premia. Likewise, in the case of the euro area, communications by the ECB may affect market perceptions of tail risks, as exemplified by market reactions to the announcement of the OMTs. If particular

[19] See www.ecb.int/press/pr/date/2012/html/pr120906_1.en.html.

measures are anticipated, investors will price them in even before the specifics are announced. As a result, policy announcements will affect yields only if they deliver a surprise to the market.

Second, liquidity provision to banks may influence the level of very short-term interest rates through liquidity effects in the interbank money market. To the extent that such measures result in excess central bank liquidity accumulating in the market, unconventional policies can cause a spread between the key policy rate (i.e. the MRO rate in the ECB context) and the overnight market rate (EONIA). Also the pricing of financial instruments of more relevance for macroeconomic developments may be affected. For instance, spreads on important market interest rates (such as EURIBOR or LIBOR, which form the basis for many private credit contracts) can be reduced for a given level of the key policy rates, thereby stimulating private spending.

Finally, central bank asset purchases may impact the composition of private sector portfolios. Following Borio and Disyatat (2010), this can be referred to as broad portfolio balance channel. Under the expectations hypothesis and canonical arbitrage-free models of the term structure, asset purchases by the central bank will not affect yields. But in models that account for imperfect asset substitutability or preferred-habitat investors, changes in relative supplies brought about by central bank operations may affect the composition of portfolios and alter behaviour. For instance, Greenwood and Vayanos (2008) argue that central bank interventions may affect the term structure by changing the total quantity of duration risk that arbitrageurs must hold. When debt in public hands increases or shifts toward longer maturities, market participants are more exposed to shifts in interest rates and require higher premia to bear this extra risk. Following D'Amico and King (2012) this result can be called duration effect. D'Amico and King (2012) develop a model for what they call a local-supply effect, building upon the preferred habitat model of Vayanos and Vila (2009). In this model, preferred-habitat investors have exogenously given demand curves for securities with different maturity, and they do not trade across different maturities. In contrast, arbitrageurs do trade across different maturities and render the term structure arbitrage-free in equilibrium by buying securities that are in low demand and selling those that are in high demand, but risk aversion prevents them from engaging in this process until expected returns are equated across securities. Thus, exogenous shocks to preferred-habitat demand can have effects on prices. Within this framework, D'Amico and King (2012) distinguish two ways in which central bank asset purchases might operate: stock effects and flow effects. Stock effects are defined as persistent changes in prices that result from movements along government bond demand curves. Flow effects are defined as the response of prices to the ongoing purchase operations and could reflect, on top of portfolio rebalancing activity due to the outcome of the

purchases, impairments in liquidity and functioning that lead to sluggish price discovery. Cúrdia and Woodford (2011) demonstrate that the portfolio-channel may also become relevant in a New Keynesian setting with imperfect asset substitutability. However, in their model this may only be relevant in case of severe market disruptions and with targeted asset purchases by the central bank, while quantitative easing in the strict sense remains ineffective.

A final example is provided by De Pooter *et al.* (2012). These authors develop a search-based asset-pricing model with default in which the asset's fundamental value is affected by liquidity risk, i.e. the risk that an agent cannot immediately sell an asset for the equilibrium price due to search frictions. This risk of delay then translates into an equilibrium liquidity premium on bond purchases. As a consequence, the equilibrium price is lower – and the associated yield higher – than the price that would prevail in a frictionless world. Within this model, central bank interventions can affect bond yields by reducing the liquidity premium via two channels. A stock channel works via the reduction in the overall supply of bonds in the market. As fewer bonds are available for sale, it becomes less likely that these bonds are in the hands of agents who would like to sell. The flow channel, instead, is characterised by central bank purchases taking bonds immediately out of the hands of impatient bondholders. As the most impatient and risk-averse agents are driven out of the market, the liquidity risk premium commanded by the remaining agents should decrease. So the model provides a theoretical justification for the existence of a permanent stock effect and a temporary flow effect of asset purchases by central banks (see below for a discussion of their empirical evidence).

4.4.3. Effectiveness

Caveats

As pointed out by Kozicki *et al.* (2011), research on the effectiveness of unconventional monetary policy faces several problems. First, central banks and fiscal authorities in many countries were simultaneously announcing and undertaking several policy initiatives, making it difficult to single out the effect of unconventional policies[20]. Also regulatory changes will impact the effectiveness of unconventional monetary policy[21]. Second, the reaction of financial markets

[20] A case in point is the announcement of SMP on 10 May 2010, which was nearly simultaneous with the agreement on establishment of the EFSF, and only one week later than agreement on the first EU/IMF program for Greece.

[21] Van den End (2012) examines what happens if banks would adjust to Basel III, by holding a higher stock of liquid assets. In particular a narrowly defined liquidity buffer – made up by high quality government bonds – makes a big difference in limiting the tail risks of banks. The flip side of larger liquid bond holdings is that monetary policy conducted through asset purchases gets more influence on banks relative to extended refinancing operations.

to these policy initiatives may have changed over time. For instance, whereas initially fiscal stimulus was considered as a stabilizing force, concerns about sovereign indebtedness in some regions may have changed this when the crisis lingered on. Likewise, there is some evidence suggesting that yield changes on key assets at the time of past asset purchase programme announcements are less than those of more recent programme announcements (Ehlers and Sushko (2012)). Third, potentially long and variable policy lags complicate the assessment. Unconventional monetary policies during crisis periods may have more immediate effects through the expectations channels in addition to effects through the standard channels of transmission. Fourth, the ongoing nature of the crisis makes it hard to determine what the evolution of economic and financial conditions would have been in the absence of policy responses. Fifth, whereas a particular policy initiative may have been designed primarily to mitigate a specific challenge, they may have spill over effects across markets. Similarly, policies of one country may have spill over effects in other countries.

Apart from these identification problems, Kozicki *et al.* (2011, p. 14) point out that "most studies tend not to discuss the possible negative externalities arising from these measures, including potential financial market distortions, issues related to balance sheet management and, ultimately, concerns with respect to central bank credibility and independence. Thus, conclusions drawn from studying the effects of unconventional monetary policies must be treated with appropriate caution." With this caveat in mind, we now turn to the evidence.

4.4.4. Liquidity Support

In the literature various empirical methods are used to identify the effectiveness of extended liquidity support, ranging from straightforward regression analysis to structural vector autoregressive (SVAR) models. The overall conclusion is that central banks' liquidity support has significantly reduced money market rates and thereby supported financial transmission and the economy.

Several papers have used *Vector Autoregression (VAR) models* to examine the impact of the ECB's unconventional policies. Frank and Hesse (2009) estimate a VAR model for changes in the US and euro area Libor-OIS spreads. Libor fixings in euros and US dollars are likely to display substantial interdependencies. The LTROs by the ECB is used as an explanatory variable, whereby differentiation is also made between the announcement and the actual implementation dates. The model is estimated for the crisis period spanning from July 1, 2007 until April 3, 2008. Although the authors find that the announcement of the LTROs by the ECB has a statistically significant effect, its economic magnitude is small (only 5 basis point reduction in the European market).

Cihak *et al.* (2009) use a VAR-based model that additionally imposes a no-arbitrage condition as commonly applied in affine term structure finance models. The model comprises four macroeconomic variables as state variables: (i) the output gap; (ii) year-on-year inflation; (iii) the monthly average EONIA rate; and (iv) the one-year Euribor interest. Data are monthly observations from January 1999 to January 2009. The yields predicted by the model track actual bond yields very closely, but the residuals sharply turned negative in October 2008, when the ECB introduced a host of new non-standard measures. These results suggest that the ECB's policy actions during the crisis had some effect on yields.

Lenza *et al.* (2010) examine the impact of the ECB's unconventional policy measures by constructing counterfactual paths for the main macroeconomic variables under two scenarios: (a) a no policy scenario (to be understood as a scenario where non-standard measures are not implemented); and (b) a policy scenario, where that spread is reduced by policy intervention through the introduction of non-standard measures (where it is assumed that this scenario is captured by the path of money market rates observed in reality). The model parameters are estimated from January 1991 until the end of 2007, before the non-standard policies were implemented. Their results suggest that without the unconventional policies the 3 months (12 months) interest rates would have been approximately 200 (100) basis points higher in June 2009. The effect of non-standard measures on consumer loans and loans for housing purchases is large and positive, while the effect on loans to non-financial corporations becomes positive only after a delay. The authors conclude that "our results suggest that the non-standard measures have played a quantitatively significant role in stabilizing the financial sector and economy after the collapse of Lehman Bros., even if insufficient to avoid a significant fall in economic and financial activity" (p. 329).

These conclusions are underlined by the analysis conducted by Fahr *et al.* (2011) who estimate a structural vector autoregressive (SVAR) model for the euro area with the aim to identify different shocks hitting the economy and the financial system. Their model includes twelve macroeconomic and financial variables with monthly data over the period January 1999 until June 2010. Fahr *et al.* find that a financial shock, i.e. a shock that affects the interbank lending spread, plays an important role in explaining the 2008-2009 recession. Moreover, they find that a financial shock can be absorbed by banks if the central banks chooses to accommodate the ensuing increase in banks' demand for liquidity. These conclusions are supported by a counterfactual analysis using the DSGE model developed by Christiano *et al.* (2010) which includes a banking and financial sector. These counterfactual analyses confirm that the unprecedented increase in the demand for liquidity would have led to a marked deterioration in interbank lending conditions in absence of central bank intervention, which would have impacted broader macroeconomic conditions.

Peersman (2011) also estimates a SVAR model for the Euro area economy with monthly data over the sample period 1999-2009. Within this SVAR, he identifies three possible sources of disturbances at the supply side of the credit market: (i) innovations to credit supply that are independent of a policy action, (ii) credit supply shocks resulting from a shift in the monetary policy rate, and (iii) innovations to credit supply caused by monetary policy actions that are orthogonal to the policy rate (unconventional monetary policy shocks). Compared to the effects of traditional interest rate innovations, Peersman finds similar macroeconomic consequences of an unconventional policy shock. The magnitude of the impact on economic activity is, for instance, similar for a 25 basis points decline in the policy rate or a 10 percent increase in the monetary base which is orthogonal to the policy rate. The transmission mechanism, however, turns out to be different for both instruments. Whilst the effects on economic activity and consumer prices reach a peak after about one year for interest rate innovations, this is more than six months later for innovations to the monetary base. Furthermore, bank interest rate spreads increase significantly after an expansionary interest rate innovation, whereas spreads persistently decline after an action which raises the size of the Eurosystem's balance sheet.

A potential problem with single-country VAR studies is that they rely on models estimated over sample periods covering also the pre-crisis period, which may not be adequate for assessing monetary transmission in a liquidity trap. Therefore, Gambacorta *et al.* (2012) estimate a panel structural vector autoregressive (SVAR) model over a sample period during which unconventional policies were implemented in Canada, the euro area, Japan, Norway, Sweden, Switzerland, the United Kingdom and the United States. The sample period is January 2008 until June 2011. The authors conclude that an expansionary unconventional monetary policy shock leads to a significant but temporary rise in output and prices. While the output effects are qualitatively similar to the ones typically found in the literature on the effects of conventional monetary policy, the impact on the price level seems to be less persistent and weaker. They do not find major cross-country differences in the macroeconomic effects of shocks to central bank balance sheets, despite the different measures that were taken in response to the crisis. Since the panel analysis is based on a mean group estimator, it also yields individual country estimates. They find that the euro area results are very similar to those obtained by Peersman (2011).

Finally, Darracq Pariès and De Santis (2013) assess the effects of the 3-year LTROs. These authors identify the implied non-standard monetary policy shock through the Bank Lending Survey (BLS) information for the beginning of 2012, assuming that the main transmission channel of the LTROs works through the mitigation of liquidity and funding risks in the euro area banking system. They estimate a panel-VAR for the euro area countries, which include relevant BLS

variables, and find that that the 3-year LTROs significantly lifted prospects for real GDP and loan provision to non-financial corporations over the next two-to-three years.

An alternative approach is the *event study methodology* which has some advantages and disadvantages (Aït-Sahalia *et al.* (2012)). The most important advantages are its simplicity, parsimony, and focus on the immediate market response to an event, i.e. a policy announcement. Event studies are better designed to deal with issues such as limited sample size and model specification. Their main disadvantages are that they do not address causality and that they cannot provide a comprehensive evaluation of policy effectiveness.

Aït-Sahalia *et al.* (2012) apply the event study approach, focusing on the period June 1, 2007-March 31, 2009. Their database covers announcements of authorities in the United States, the United Kingdom, the euro area, and Japan in the area of fiscal policy, monetary policy (including liquidity support) and financial sector policy. Their main indicator of financial distress is the change in the spread between London Interbank Offered Rates (LIBOR) and Overnight Index Swaps (OIS) for the US dollar. The results of Aït-Sahalia *et al.* (2012) do not yield strong evidence that domestic liquidity support helped relieve pressures in the interbank markets: announcements of domestic currency liquidity support were associated with a decline in the Libor-OIS spread, but the statistical significance of this result diminishes when the event window is narrowed. Announcements of forex swaps were associated with significant declines in interbank risk premia.

Angelini *et al.* (2011) use *regression analysis* to examine interbank rates as these are a key part of the monetary policy transmission mechanism. Using a unique data set based on the e-MID (a screen-based trading facility used by Italian and other European banks to exchange uncollateralized interbank funds) between January 25, 2005 and December 31, 2008, the authors regress interest rates spreads on a set of market-wide and bank-specific variables. They include dummy variables equal to 1 on the day of the announcement of exceptional long-term refinancing operations (1-, 3-, and 6-month maturity) launched by the ECB after August 2007. The results suggest that the exceptional ECB interventions dampened the spread only after the Lehman failure: the impact effect was about -10 and -15 basis points for the 3- and 1-month special refinancing operations, in that order.

Abbassi and Linzert (2011) analyze the effectiveness of monetary policy in steering euro area money market rates using two measures: first, the predictability of money market rates on the basis of monetary policy expectations, and second the impact of extraordinary central bank measures on money market rates. Their sample periods are 10 March 2004-8 August 2007 (pre-crisis) and 9 August 2007-30 June 2009 (crisis). Abbassi and Linzert argue that for an effective monetary policy, it is crucial that interest rate expectations are in line with the central bank

policy intentions and are correctly reflected in the shape of the yield curve. Likewise, if non-standard monetary policy measures were effective, they should lower the tensions in money markets. These authors report that market expectations about monetary policy are less relevant for money market rates up to 12 months after August 2007 compared to the pre-crisis period. In addition, they find that the ECB's net increase in outstanding open market operations as of October 2008 accounts for at least a 100 basis point decline in Euribor rates.

4.4.5. SMP

In his overview paper, Manganelli (2012) concludes that while studies about the effectiveness of the SMP rely on different methodologies and data frequencies the asset purchases had a positive but short-lived effect on market functioning by reducing liquidity premia and lowering the level as well as the volatility of yields.

Baumeister and Benatti (2010) explore the macroeconomic impact of a compression in the long-term bond yield spread within the context of the Great Recession of 2007-2009 via Bayesian time-varying parameter structural VARs for the Euro area, the United States, Japan, and the United Kingdom. They identify a 'pure' spread shock which, leaving the short-term rate unchanged by construction, allows them to characterise the macroeconomic impact of a compression in long-term yield spreads induced by central banks' asset purchase programmes within a zero lower bound environment. The authors conclude that a compression of the long-term yield spread exerts a powerful effect on both output growth and inflation. They also conclude that the asset purchase programmes in the US and the UK have averted significant risks both of deflation and of output collapses comparable to those that took place during the Great Depression. They do not examine the effects of the SMP, but three recent papers do.

De Pooter *et al.* (2012) examine whether the SMP had an impact on sovereign bond liquidity premia. For that purpose they use a term structure model to decompose bond prices into parts describing the risk-free rate, default intensity, and a liquidity premium. They use the difference between the default probability according to CDS and bonds as measure of the liquidity premium. The risk-free rate is measured by relevant maturity German bond yields[22]. The ECB made SMP purchases off and on over a long period of time and made these purchases in five distinct sovereign markets beginning with Greece, Ireland and Portugal in May 2010 and then expanding the program to Spain and Italy on August 7, 2011. The structure of these purchases allows the authors to exploit both cross-section and time series elements of the data. Using data for the sample January 1, 2009

[22] Thereby neglecting a flight-to-quality effect.

through February 29, 2012, the authors find a 19.4 basis point impact decline of the liquidity premium to a purchase of one percent of debt outstanding – of which 14.8 basis points is temporary. The permanent effect is therefore 4.6 basis points; this effect is highly significant.

Kilponen *et al.* (2012) study daily price data of 7 countries in the euro area and find that among 55 different European policy decisions between 2007 and 2012, the announcement of SMP had the most significant effects on 10-year sovereign bond yields.

Ghysels *et al.* (2012) analyse the high-frequency dynamics of bond yields and ECB purchases of sovereign bonds. By matching the timing and amounts purchased with the prevailing intraday quotes at sufficiently high frequency, the authors are able to isolate the immediate effect of the purchases from the impact of the other shocks that hit the market during the rest of the day. When the authors regress yield changes on SMP interventions at 15-minute intervals, they find that a EUR 100 million intervention has an immediate impact on bond yields of between 0.1 and 25 basis points, depending on the size of the market.

Finally, Eser and Schwaab (2012) use a panel of daily data for bond yields and SMP interventions. If both ECB bond purchases and yield developments react to an unobserved news flow, regressing yield changes on SMP purchases gives rise to an endogeneity problem. To deal with this problem, the authors adopt a factor modeling methodology using as controls both observed and unobserved factors that can approximate the unobserved news flow affecting yield developments. The observed factors used in the analysis are the VIX volatility and the spread between BBB and AAA-rated corporate bonds in the euro area. The latent factors include a common and a country-specific component, which should account for both common and idiosyncratic shocks. The authors find that, on average, a daily SMP intervention of EUR 100 million lowered yields by 0.1 to 2 basis points. In addition, SMP purchases have significantly contributed to lower yield volatility. The cumulated persistent effect over time of a total purchase of EUR 50 billion results in a cumulative reduction in yields of approximately 90 basis points for large countries and 1,000 basis points for smaller countries.

4.5. NEW EVIDENCE ON THE EFFECTIVENESS OF UNCONVENTIONAL POLICIES OF THE ECB

The ECB's SMP focused more narrowly on stabilizing securities markets, as opposed to quantitative easing by, for instance, the Fed[23]. In order to examine

[23] For recent analyses of the Fed's policies, we refer to Gagnon *et al.* (2011), D'Amico and King (2012) and D'Amico *et al.* (2012).

how effective the SMP has been, we follow Eser and Schwaab (2012) and use a panel of daily bond yields, CDS spreads and other market data, over the period June 2010 to June 2012. We extend their analysis by using a different and innovative method to extend the factor analysis results and calculate hypothetical yields. In addition, we assess both the impact of ECB (SMP, MROs, LTROs) and EFSF interventions, as measured by weekly outstanding volumes. For the SMP, MROs and LTROs, we take weekly changes in volumes of the overall portfolios, while for EFSF we take the effective size of the facility, which was raised at European Summits in Brussels (July 2011) and Copenhagen (March 2012). We restrict ourselves to a simple impact analysis and do not assess potential channels through which the interventions impact market prices. Needless to say, our estimations are surrounded by considerable model and estimation uncertainty, as is usual in this kind of analyses.

Factor analysis allows us to disentangle a smaller number of latent (unobserved) factors which drive the observed variables. The observed variables are estimated as a linear combination of unobserved factors and coefficients, or factor loadings. We seek to explain the 10 year government bond yields of peripheral euro area countries, including both control variables (CDS spreads, money market spreads, stock price indices, exchange rates and volatility indicators) and the impact of policy interventions such as MROs, LTROs, SMP and the EFSF. The methodology yields factor loadings for each variable, which can be clustered based on significance. Loadings above 0.6 are considered significant, as are factors with an eigen value above 1.0. Where a factor shows positive loadings with the intervention, and negative loadings with spreads, it can be judged to be the desired "implementation effect" of a policy intervention.

Table 4.3 shows the coefficients of the factor analysis. It is immediately apparent that there is a strong common driver behind the CDS spreads and bond yields of peripheral euro area countries, interbank spreads and broader credit spreads of EU banks. Factor 1 can thus be interpreted as "peripheral credit risk", which is itself a driver of SMP intervention. Both the SMP and credit spreads have a positive correlation with factor 1, as an indication of the endogeneity issue. Most of these variables show a slight negative correlation with factor 2, which is driven by the MSCI World and Europe stock indices and (negatively) by volatility as measured by the VIX index. We thus interpret factor 2 as "global stock market conditions". Factor 3 shows common drivers behind the bond yields of Spain and Ireland, which both experienced a severe banking crisis and hence had correlated idiosyncratic risks. We interpret factor 4, meanwhile, as "effect of the Eurosystem's MROs and LTROs"; the two are negatively correlated with one another due to their substitution for one another over time. The Eurosystem interventions show strong correlation with the volatility of the dollar/euro exchange rate, indicating that the interventions influenced risk perceptions of break-up scenarios.

They also have some *negative* correlation (circa 0.2) with the CDS of peripheral countries, indicating an implementation effect. Finally, factor 5 represents "effect of EFSF", which is strongly correlated with Greek CDS – given that increases in the capacity of the EFSF have been decided at the same moments that credit concerns around Greece have come to a head. This factor also shows small *positive* (0.1-0.4) correlation with CDS spreads of peripheral countries, meaning that the endogeneity problem dominates over the implementation effect. Overall, the fact that none of the factors with strong loadings for policy interventions have opposite signs for the loadings for bond yields and credit spreads means that, *prima facie*, the long-term implementation effect is not strong, particularly for the SMP and EFSF.

In order to better understand the effects of interventions, we go one step further, using the output from the factor analysis. The autonomous impact of policy intervention can be teased out by generating a hypothetical yield which excludes the effect of intervention. We first calculate the partial correlation coefficient p, which represents the correlation between the 10 year yield (Y) and the interventions (X), adjusted for the effects of all other variables:

X = Re $g(X_1, X_2, X_3, \ldots, X_n)$ without Y: residuals R_X

Y = Re $g(X_1, X_2, X_3, \ldots, X_n)$ without X: residuals R_Y

where partial correlation $p = corr(R_x, R_y)$. It also follows from the regression of the residuals,

$R_y = a + b * R_x = b * R_x$.

To determine p, we can use variances, whereby the coefficient of determination is:

$$R^2 = \frac{\text{var}(R_x)}{\text{var}(R_y)}$$

where square root R^2 equals p and 1/b. The effect of interventions is $b * R_x$ which is the difference between the actual yield (Y) and a hypothetical $Y - b * R_x$ yield that excludes this effect.

The difference between the actual and hypothetical yield reflects the autonomous impact of policy intervention. A negative difference indicates that the actual yield is lower than the hypothetical counterfactual without intervention. These calculations (not shown) suggest that the increases in the effective size of the EFSF in July 2011 and March 2012 seem to have had large downward impact on the bond yields. The increases lowered bond yields of Italy, Portugal and Spain compared

to the hypothetical yield without intervention to the order of 30 to 60 basis points, and even more for Greece and Ireland.

Table 4.3: Coefficients of factor analysis

	Factor1	Factor2	Factor3	Factor4	Factor5
Italian CDS	0.90	0.07	-0.17	-0.21	0.26
Greek bond yield	0.90	-0.14	0.06	-0.02	0.23
SMP	0.89	-0.18	-0.04	-0.18	0.35
Spanish CDS	0.87	0.05	0.08	-0.20	0.26
Portuguese CDS	0.83	-0.20	0.12	-0.23	0.37
Interbank spread	0.81	-0.45	-0.06	0.25	-0.13
Portuguese bond yield	0.81	-0.18	0.43	-0.17	0.16
Italian bond yield	0.80	-0.27	0.38	0.06	0.13
Irish CDS	0.79	-0.15	0.49	-0.01	0.01
EU bank CDS	0.76	-0.47	0.18	0.11	0.26
EU sovereign CDS	0.56	-0.54	0.44	0.28	-0.07
MSCI Europe Index	-0.38	0.88	0.15	-0.05	-0.20
MSCI World Index	-0.01	0.85	0.39	-0.27	0.02
VIX Index	0.12	-0.81	0.18	0.05	0.13
Irish bond yield	0.04	0.16	0.95	0.10	-0.13
Spanish bond yield	0.44	-0.05	0.63	-0.03	0.41
MRO volume	-0.14	-0.20	-0.01	0.89	-0.17
EUR/USD volatility	0.04	-0.55	0.12	0.66	-0.12
LTRO volume	0.44	-0.09	-0.28	-0.58	0.56
Greek CDS	0.41	-0.10	-0.03	-0.22	0.82
EFSF volume	0.52	-0.33	0.09	-0.35	0.55
Eigen value	8.34	3.60	2.48	2.18	2.16

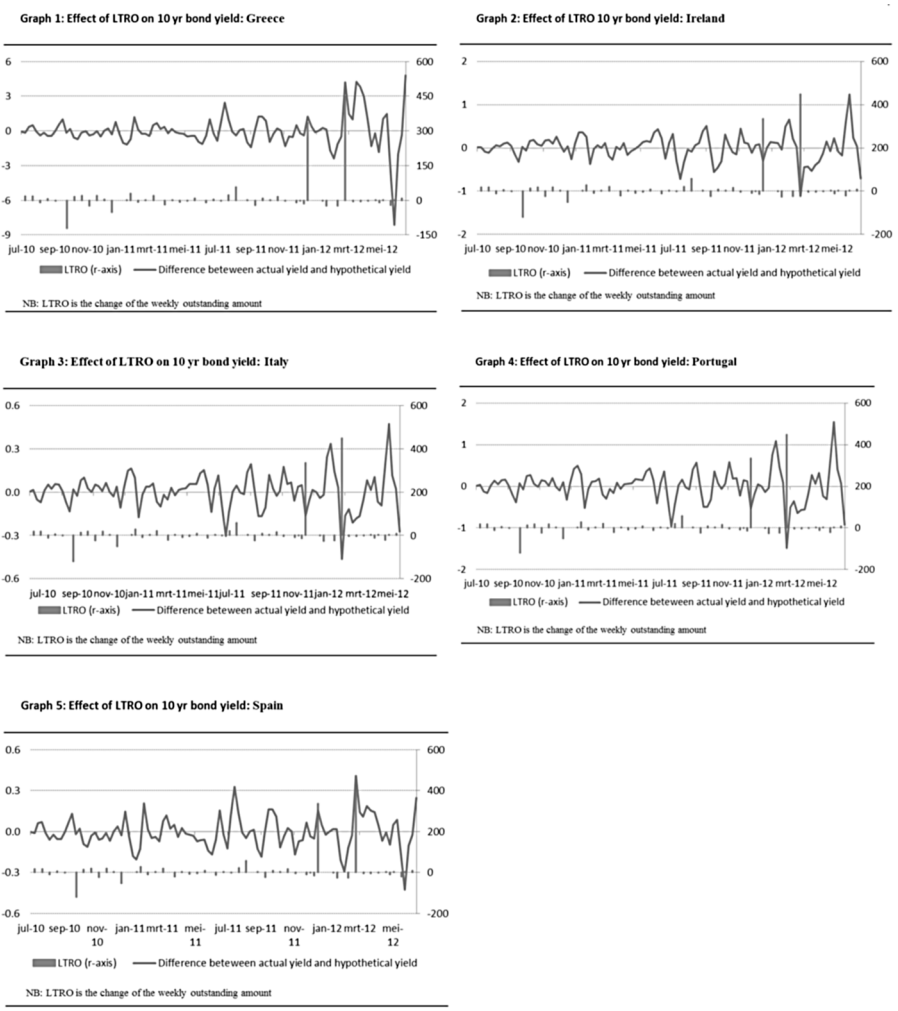
MSA model = 0.81 (Kaiser-Myer-Olkin (KMO) measure of sampling adequacy)

Interpretation:
Factor 1: "peripheral credit risk
Factor 2: "global stock market conditions"
Factor 3: "idiosyncratic Spanish and Irish bond market risk"
Factor 4: "effect of the Eurosystem's MROs and LTROs"
Factor 5: "effect of EFSF"

The same holds for the December 2011 and especially February 2012 three year LTROs, which appear to have lowered yields by 10 to 50 basis points for Italy, or as much as 150bp for Portugal (see Figure 4.10). Yet conspicuously, this positive effect often lasts only for a matter of weeks before dissipating or even reversing. For Greece, estimations are extremely volatile and – with the exception of the

re-start of the SMP in Summer 2011, when yields fell by 400bp compared to the hypothetical – show little consistency with the expected effects of European-level interventions. This highlights that Greece – so often a driver of European action against the debt crisis – remains a different case when it comes to policy impact.

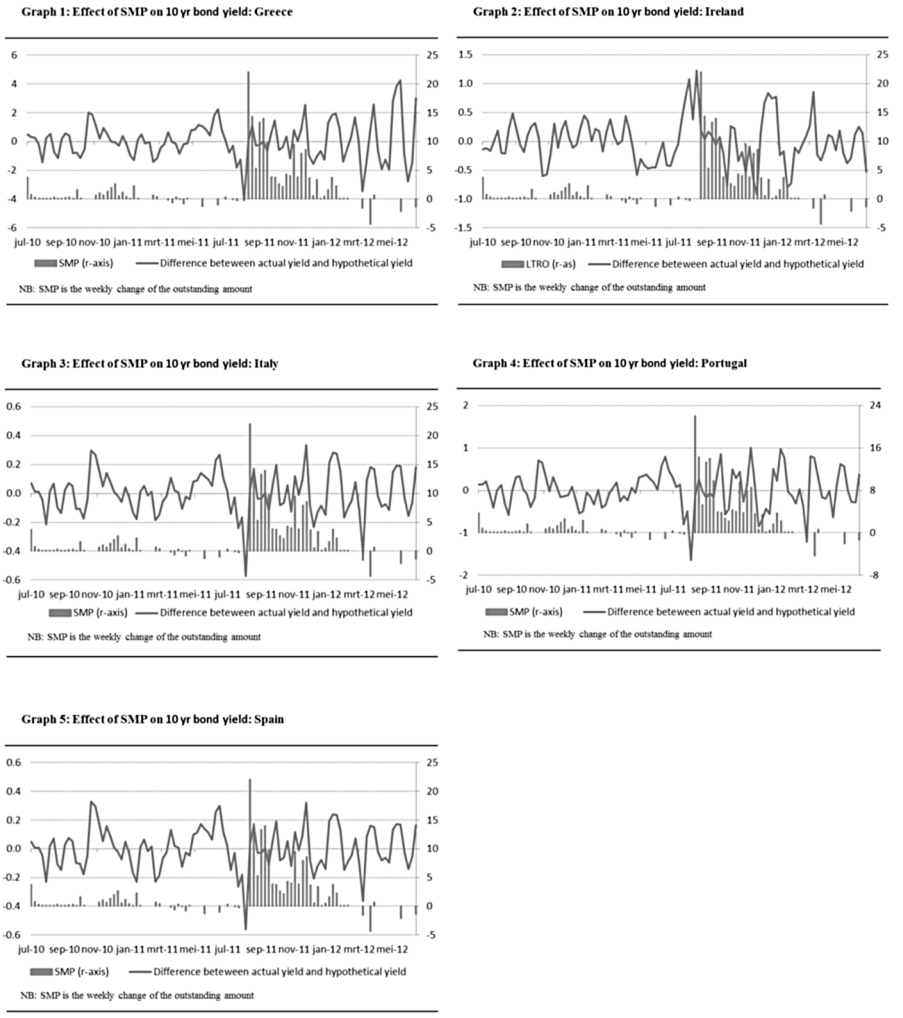
Figure 4.10: Effect of LTRO: Actual *vs.* Hypothetical bond yields for GIIPS countries



The outcomes show that the EFSF and LTRO interventions in general had a favorable (short-term) effect on government bond yields. 10-year sovereign yields in Italy, Spain, Portugal and Ireland declined after a substantial increase in EFSF or LTRO outstandings. Only the bond yield of Greece reacted differently. Changes in the SMP only had a visible downward effect on bond yields in Summer 2011,

when the program was reactivated for Italy and Spain (see Figure 4.11). However this seems limited to a temporary effect only, which dissipated within a few weeks of the intervention. This is in line with the findings in other studies, such as De Pooter *et al.* (2012), in which the permanent impact is much smaller than the initial impact (see Section 4.3.).

Figure 4.11: Effect of SMP: Actual vs Hypothetical bond yields for GIIPS countries



Recent experience shows that central bank and government policy actions can have significant effects – both positive and negative – on credit spreads. For example, ECB President Draghi's 26 July 2012 comments that the ECB's actions "will be enough" to protect the solidity of the euro led to a sustained fall in peripheral

bond yields, as did the announcement of Outright Monetary Transactions (OMTs) on 6 September 2012. The scale of the market reaction, which occurred without actual activation, is more likely to stem from a signalling effect – albeit through expectations of future asset purchases, rather than through interest rate decisions. On the other hand, negative news on the (lack of) outcome of Eurogroup discussions on Greece (22 November 2012) or political turmoil in Italy (December 2012) caused spreads to rise. The size and sustainability of these effects can be unpredictable, given that they depend in large part on market perceptions about inherently uncertain tail risk scenarios. Overall, we conclude that the most important unobserved variable – trust by the markets in the credibility of policy – is likely driving both the absolute value of spreads and the extent to which central bank policy interventions are effective in lowering spreads.

4.6. CONCLUSIONS

In this contribution we have first sketched how central banks have used unconventional monetary policy measures by using three indicators based on the composition of the balance sheet of eleven central banks. Our analysis suggests that although the ECB's balance sheet has increased dramatically during the crisis, the non-standard monetary policy measures had only a moderate impact on the composition of the ECB's balance sheet compared to other central banks, such as the Fed and the Bank of England.

Next, we have taken stock of research analysing the effects of unconventional monetary policy of the ECB after the onset of the crisis. A crucial question is to what extent these measures have been able to affect interest rates, thereby restoring the monetary policy transmission process and supporting the central bank objectives. We find that various empirical methods are used to identify the effectiveness of extended liquidity support, ranging from straightforward regression analysis to structural vector autoregressive (SVAR) models. While this adds to a divergence of results, the overall conclusion is that central banks' liquidity support has significantly reduced money market rates and thereby supported financial transmission and the economy. Likewise, studies about the effectiveness of the SMP rely on different methodologies and data frequencies but generally conclude that the asset purchases had a positive but short-lived effect on market functioning by reducing liquidity premia and lowering the level as well as the volatility of yields.

Finally, we have offered new evidence on the effectiveness of the ECB's unconventional monetary policy measures, i.e. extended liquidity provision (LTRO) and the Securities Market Programme (SMP). The results suggest that the LTRO interventions in general had a favorable (short-term) effect on government bond

yields. Changes in the SMP only had a visible downward effect on bond yields in Summer 2011, when the program was reactivated for Italy and Spain, but this effect dissipated within a few weeks.

REFERENCES

ABBASSI, P. and LINZERT, T., 2011, "The Effectiveness of Monetary Policy in Steering Money Market Rates During the Recent Financial Crisis", *ECB Working Paper* 1328.

AÏT-SAHALIA, Y., ANDRITZKY, J., JOBST, A., NOWAK, S. and TAMIRISA, N., 2012, "Market Response to Policy Initiatives during the Global Financial Crisis", *Journal of International Economics*, 87, 162-177.

ANGELINI, P., NOBILI, A. and PICILLO, Ch., 2011, "The Interbank Market after August 2007: What Has Changed, and Why?", *Journal of Money, Credit and Banking*, 43, 923-958.

BAUMEISTER, Ch. and BENATI, L., 2010, "Unconventional Monetary Policy and the Great Recession-Estimating the Impact of a Compression in the Yield Spread at The Zero Lower Bound", *ECB Working Paper* 1258.

BEIRNE, J., DALITZ, L., EJSING, J., GROTHE, M., MANGANELLI, S., MONAR, F., SAHEL, B., SUŠCEC, M., TAPKING, J. and VONG, T., 2011, "The Impact of the Eurosystem's Covered Bond Purchase Programme on the Primary and Secondary Markets", *ECB Occasional Paper* No. 122.

BENATI, L. and GOODHART, Ch., 2010, "Monetary Policy Regimes and Economic Performance: The Historical Record, 1979-2008" in B.M. FRIEDMAN and M. WOODFORD (Eds.), *Handbook of Monetary Economics*, pp. 1159-1236, Elsevier, Amsterdam.

BERNANKE, B., 2006, *Monetary Aggregates and Monetary Policy at the Federal Reserve: A Historical Perspective*, Board of Governors of the FED, Washington DC.

BEYER, A., GASPAR, V., GERBERDING, Ch. and ISSING, O., 2009, "Opting Out of the Great Inflation: German Monetary Policy after the Break Down of Bretton Woods", *ECB Working Paper* 1020.

BLINDER, A.S., EHRMANN, M., FRATZSCHER, M., DE HAAN, J. and JANSEN, D.-J., 2008, "Central Bank Communication and Monetary Policy: A Survey of Theory and Evidence", *Journal of Economic Literature*, 46, 910-45.

BORIO, C. and DISYATAT, P., 2010, "Unconventional Monetary Policies: An Appraisal", *The Manchester School*, 78(s1): 53-89.

BRUNNER, K. and MELTZER, A.H., 1993, *Money and the Economy: Issues in Monetary Analysis,* Cambridge University Press, Cambridge.

CHRISTIANO, L., MOTTO, R. and ROSTAGNO, M., 2010, "Financial Factors in Economic Fluctuations", *ECB Working Paper* 1192.

CIHÁK, M., HARJES, Th. and STAVREV, E., 2009, "Euro Area Monetary Policy in Uncharted Waters", *IMF Working Paper* 09/185.

CURDÍA, V. and WOODFORD, M., 2011, "The Central-Bank Balance Sheet as an Instrument of Monetary Policy", *Journal of Monetary Economics*, 58(1), 54-79.

D'AMICO, S., ENGLISH, W., LOPEZ-SALIDO, D. and NELSON, E., 2012, "The Federal Reserve's Large-Scale Asset Purchase Programs: Rationale and Effects", *Federal Reserve Finance and Economics Discussion Series* 2012-85.

D'AMICO, S. and KING, T.B., 2012, "Flow and Stock Effects of Large-scale Treasury Purchases: Evidence on the Importance of Local Supply", *Journal of Financial Economics*, forthcoming, http://dx.doi.org/10.1016/j.jfineco.2012.11.007.

DARRACQ-PARRIES, M. and DE SANTIS, R., 2013, "A Non-Standard Monetary Policy Shock: The ECB's 3-year LTROs and the Shift in Credit Supply", *ECB Working Paper* 1508.

DE HAAN, J., OOSTERLOO, S. and SCHOENMAKER, D., 2012, *Financial Markets and Institutions: A European Perspective*, Cambridge, Cambridge University Press.

DE POOTER, M., MARTIN, R.F. and PRUITT, S., 2012, *The Effects of Official Bond Market Intervention in Europe. Federal Reserve Board of Governors*. Available at: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2143326.

EGGERTSSON, G. and WOODFORD, M., 2003, "The Zero Bound on Interest Rates and Optimal Monetary Policy", *Brookings Paper on Economic Activity 1*, pp. 139-211.

EHLERS, T. and SUSHKO, S., 2012, "Unconventional Policies: Market Impact and Countervailing Factors", *BIS Quarterly Review*, September 2012, 6-7.

ESER, F. and SCHWAAB, B., 2012, *The Yield Impact of Central Bank Asset Purchases: The Case of the ECB's Securities Markets Programme*, ECB, mimeo.

EUROPEAN CENTRAL BANK, 2011, *The Monetary Policy of the ECB*, Frankfurt, ECB.

FAHR, S., MOTTO, R., ROSTAGNO, M., SMETS, F. and TRISTANI, O., 2011, "A Monetary Policy Strategy in Good and Bad Times: Lessons from the Recent Past", *ECB Working Paper* 1336.

FRANK, N. and HESSE, H., 2009, "The Effectiveness of Central Bank Interventions during the First Phase of the Subprime Crisis", *IMF Working Paper* 09/206.

FRIEDMAN, M., 1968, "The Role of Monetary Policy", *American Economic Review,* 58 (1), 1-17.

GAGNON, J., RASKIN, M., REMACHE, J. and SACK, B., 2011, "The Financial Market Effects of the Federal Reserve's Large-Scale Asset Purchases", *International Journal of Central Banking*, 7(1), 3-43.

GAMBACORTA, L., HOFMANN, B. and PEERSMAN, G., 2012, "The Effectiveness of Unconventional Monetary Policy at the Zero Lower Bound: A Cross-Country Analysis" *BIS Working Papers* 384.

GHYSELS, E., IDIER, J., MANGANELLI, S. and VERGOTE, O., 2012, *A High Frequency Assessment of the ECB Securities Markets Programme*, ECB, mimeo.

GONZÁLEZ-PÁRAMO, J.M., 2011, *The ECB and the Sovereign*, Speech at the XXIV Moneda y Crédito Symposium, 4 November 2011.

GREENWOOD, R. and VAYANOS, D., 2008, "Bond Supply and Excess Bond Returns", *NBER Working Paper* 13806.

HANNOUN, H., 2012, *Monetary Policy in the Crisis: Testing the Limits of Monetary Policy*, Speech at 47th SEACEN Governors' Conference Seoul, Korea, 13-14 February 2012.

HILBERS, P., 1998, "Financial Sector Reform and Monetary Policy in the Netherlands", *IMF Working Paper* 98/19.

INTERNATIONAL MONETARY FUND (IMF), 2009, "Market Interventions During the Financial Crisis: How Effective and How to Disengage", *Global Financial Stability Report*, October.

JOHNSON, H.G., 1971, "The Keynesian Revolutions and the Monetarist Counter-Revolution", *American Economic Review,* 61 (2), 91-106.

JOYCE, M., TONG, M. and WOODS, R., 2011, "The United Kingdom's Quantitative Easing Policy: Design, Operation and Impact", *Bank of England Quarterly Bulletin* 2011 Q3.

KILPONEN, J., LAAKKONEN, H. and VILMUNEN, J., 2012, "Sovereign Risk, European Crisis Resolution Policies and Bond Yields", *Bank of Finland Research Discussion Paper* 22.

KLYUEV, V., DE IMUS, Ph. and SRINIVASAN, K., 2009, "Unconventional Choices for Unconventional Times Credit and Quantitative Easing in Advanced Economies", *IMF Staff Position Note* 2009/27, October.

KOZICKI, S., SANTOR, E. and SUCHANEK, L., 2011, "Unconventional Monetary Policy: The International Experience with Central Bank Asset Purchases", *Bank of Canada Review*, Spring 2011, 13-25.

LENZA, M., REICHLIN, L. and PILL, H., 2010, "Monetary Policy in Exceptional Times", *Economic Policy,* April 2010, 295-339.

MANGANELLI, 2012, "The Impact of the Securities Markets Programme", *ECB Research Bulletin* 17.

MISHKIN, F.S. and SAVASTANO, M.A., 2001, "Monetary Policy Strategies for Latin America", *Journal of Development Economics*, 66(2), 415-444.

PEERSMAN, G., 2011, "Macroeconomic Effects of Unconventional Monetary Policy Measures in the Euro Area", *ECB Working Paper* 1397.

SAMARYNA, A. and DE HAAN, J., 2013, "Right on Target: Exploring the Factors Leading to Inflation Targeting Adoption", *Contemporary Economic Policy*, forthcoming.

SACHS, J., 2012, "We Must Look Beyond Keynes to Fix Our Problems", *Financial Times*, December 18, 2012, p. 9.

STONE, M., FUJITA, K. and ISHI, K., 2011, "Should Unconventional Balance Sheet Policies be Added to the Central Bank Toolkit? A Review of the Experience So Far", *IMF Working Paper* 11/145.

SVENSSON, L.E.O., 1997, "Inflation Forecast Targeting: Implementing and Monitoring Inflation Targets", *European Economic Review*, 41(6), 1111-1146.

VAYANOS, D. and VILA, J.-L., 2009, "A Preferred-habitat Model of the Term Structure of Interest Rates", *NBER Working Paper* 15487.

VAN DEN END, J.W., 2012, "Liquidity Stress-tester: Do Basel III and Unconventional Monetary Policy Work?", *Applied Financial Economics*, 22(15), 1233-1257.

5. The Development of Financial Markets and Financial Theory – 50 Years of Interaction

Morten Balling and Ernest Gnan[1]

5.1. Introduction

The second half of the 20th century up until the onset of the financial and economic crisis in 2007 was marked by a very dynamic development in financial markets and banking. This has to be seen against the background of a general trend, starting after World War II, towards liberalisation and the global integration of financial markets and banks, and towards increasing sophistication, complexity and inter-connectedness. All these development would not have been possible without the intellectual underpinning of economic arguments for free markets, international division of labour, globalisation and without advances in financial theory and the related improvements in statistical estimation methods. But the influence worked also the other way round: practical needs and the drive for market share and earnings spurred the development of new analytical tools and techniques to price new products and their risk.

Banking has always tended to be regulated more than many other areas of the economy, because of its inherent "dangerous" nature, which has been recognized for long. However, this was less so for other areas of financial markets. Moreover, the overall post World War II belief in the benefits of free markets and the drive towards privatization, liberalisation and globalisation implied that regulation of banking and financial markets did not keep pace with the rapid evolution of banks and financial markets. That being said, regulation and taxation also motivated the creation of new products and vehicles to circumvent limitations and to "optimize" taxation in a global context.

This article starts from the notion that financial theory, the practice of banking and financial markets and financial regulation and supervision mutually influence each other. They did so both in the drive towards globally liberalized, ever more sophisticated banking and financial markets, and they have been doing so in reaction to the global financial crisis. Academia, financial practitioners and regulators/supervisors are all important players in this development. In order to better grasp the milestones in each of these three areas, the article analyses in

[1] The authors would like to thank Gerald Hubmann (Oesterreichische Nationalbank) for his excellent research assistance, and Philipp Hartmann and Jean-Eduoard Colliard (both ECB) for their input regarding the data and figures used in this chapter.

three parts, milestones in financial theory (Section 5.2), milestones in European financial market regulation (Section 5.3) and a helicopter view of 50 years of financial markets (Section 5.4). Section 5.5 draws these three threads together by identifying lessons and challenges concerning financial theory and financial markets, and Section 5.6 draws some more general conclusions for the future. In an annex to this chapter some powerful and useful data sources are listed and described that might be useful for any future follower of structural trends in financial markets.

5.2. MILESTONES IN FINANCIAL THEORY

Financial theory has developed very dynamically in the last 50 years. There has been a remarkable interaction between theory and practice. Academic research has contributed to our understanding of investor behaviour and the functioning of financial markets. Academic research has also stimulated financial innovation and led to development of new financial instruments and markets. Particularly important financial research areas in the past five decades have been portfolio theory, capital asset pricing theory, interest rate structure theory, capital structure theory, agency theory, efficient markets theory, and option pricing theory. The number of research articles and books published is very large. Below, a small selection has been made including several contributions from Nobel Prize winners in Economics.

5.2.1. Portfolio Theory

Harry M. Markowitz published in 1952 a path-breaking article (Markowitz, 1952), in which he argued that the traditional application of one-dimensional investment criteria such as the Net Present value (NPV) criterion should be replaced by two dimensions: Expected returns and risk defined as the standard deviation of the return distribution. In the following decades he expanded his model and used it in a famous book (Markowitz, 1991). He argued also that investors should not look at securities individually. It is unrealistic to assume that investors or investment advisors can predict the future return of individual stocks. However, based on empirical analysis of the co-variation of the returns of several securities, it is possible to make portfolio decisions, in which the incomplete correlation between the securities can be exploited for diversification. The focus of investors should be on the effect of combining securities. In a realistic setting, investors must make a trade-off between expected returns and risk. The available investment universe is represented by an efficient frontier with a slope and shape that reflects the interplay in the financial market between all investors with a varying degree of risk-aversion. If an individual investor wants a higher expected

return, he must accept a higher risk. It is an old saying that one should not put all one's eggs in one basket. In 1990, Markowitz received the Nobel Prize in economics for having developed a strong analytical basis for that wise recommendation, which can be followed by individuals, firms, mutual funds and institutional investors.

In 1989, J.P. Morgan decided to develop a portfolio model, which was able to measure and explain the risks of the firm on a daily basis. In 1992, J.P. Morgan launched the RiskMetrics methodology to the marketplace for free (J.P. Morgan/Reuters, 1996). The staff of the firm made daily updates of spot prices, volatility estimates and correlation estimates accessible through the internet. They explained that they did so because the firm was interested in promoting greater transparency of market risks, they wanted to establish a benchmark for market risk measurement and to use the RiskMetrics methodology to help clients to understand their portfolio risk. In 1993-1994, J.P. Morgan revised their technical document and popularized the concept Value-at-Risk (VaR) as portfolio risk measure to be applied by financial institutions in the capital adequacy calculations to be presented to financial regulators. VaR is a downside measure estimated by means of historical statistics on volatility and correlations among a sample of financial assets and focussing on the probability of suffering losses. For a given portfolio, probability and time horizon, VaR is defined as a threshold value, which can be used to instruct the portfolio manager to keep the probability of suffering losses below a certain level. VaR actually became the standard for the measurement of portfolio risk with official endorsement in the 1993 proposal from the Basel Committee as well as in the Capital Adequacy Directive (93/6/EEC) from the European Commission. *Philippe Jorion* has contributed to the popularity of VaR as portfolio risk measure (Jorion, 2006).

The Basel capital adequacy recommendations and the related EU Directives are explained and discussed in Chapter 7 on financial regulation. One of the lessons of the financial crisis after 2008 is that several large banks in Europe came into financial difficulties in spite of the fact that they used the most advanced internal risk-management models including VaR measures to determine capital adequacy. The statistical techniques used to measure volatility appeared to be inadequate to capture all the dimensions of the relevant vulnerabilities and lead in many cases to lower capital requirements. Like all other economic models, portfolio models can never be more than approximations of the complex real world. On page 1 of the technical document referred to above, J.P. Morgan reminds their clients that no amount of sophisticated analytics will replace experience and professional judgment in managing risks. In 2011, Mark Kritzman marked the upcoming 60th birthday of the original Markowitz model by writing an editorial comment in Journal of Portfolio Management (Kritzman, 2011). Referring to a comprehensive empirical study of hedge fund returns he

concluded that mean-variance optimization is still relevant. The 60-year old model is a long way from retirement.

5.2.2. Capital Asset Pricing Theory

William F. Sharpe published in 1964 an article (Sharpe, 1964) based on the Markowitz Model but supplemented with additional assumptions. One of the difficulties with the Markowitz Model is that it requires the estimation of a variance-covariance matrix, which becomes very big if the number of available securities in the investor's investment universe is high. Sharpe simplified the cumbersome estimation procedure by assuming that the returns of individual securities are only interrelated through their sensitivity to a common factor, typically the return of a broad market index. Sharpe further assumed that all investors are able to lend and borrow at the risk-free interest rate, that they agree on the shape of the efficient frontier, and that transaction costs are absent. Under these simplifying assumptions, all investors will select a combination of the market portfolio and the risk-free asset (or borrow at the risk-free interest). All portfolios will lie on the "Capital Market Line", and the slope of this line indicates the price of risk as determined by the market. Sharpe's "Capital Asset Pricing" model (CAPM) became the backbone of a lot of studies of pricing of assets in financial markets. The "betas" of the model, which measure the sensitivity of the individual stock to movements in the return on the stock market as a whole, became widely used by financial analysts and stock brokers. The so-called "Sharpe Ratio", defined as the historical return of a portfolio minus the risk-free interest rate and divided by the standard deviation of the portfolio return is used by investment advisers and mutual funds all over the world. Together with other indicators, the Sharpe Ratio is used in evaluation of the performance of mutual funds and other portfolio managers.

The CAPM has been subject to empirical testing in many studies over the years. (Roll, 1977) has in strong words even questioned the testability of the model. The outcomes of tests have been mixed, and some authors have expressed doubts above the usefulness of the model (Ross, 1978). A serious weakness is that the market participants in the model are assumed to look only one period ahead in time. It has also been criticised that it uses a single risk factor and that this is not quite enough for describing the cross-section of expected returns in the financial market (Miller, 1999). Several authors have tried to overcome such weaknesses by including other risk factors besides the market factor and to cover more than one period (Cox *et al.*, 1985 and Merton, 1973a). Other authors have argued that the CAPM should altogether be rejected. In (Dempsey, 2013) the author argues that after the experiences of the recent financial crisis the CAPM and the theory

of efficient markets may need to be replaced with a paradigm of markets as vulnerable to capricious behaviour.

Some authors have adjusted the assumptions behind the CAPM to include foreign exchange risk in an international environment. In an international capital asset pricing model (ICAPM), investors are assumed to take not only the time value of money and the premium for taking risks on the market portfolio into consideration but also the exposure to foreign exchange risk. The ICAPM assumes that the international capital market is integrated. A test of the performance of the ICAPM has been carried out by (Engel & Rodrigues, 1989). The authors find that the ICAPM performs much better when variances are not constant over time, nevertheless the model does not perform as well as less restricted models of asset pricing.

5.2.3. Interest Rate Structure Theory

Owners of bond portfolios are exposed to many risks. Relevant types of risk are interest rate risk, inflation risk, default or credit risk, currency risk and political risk. Issuers of bonds are also exposed to most of these risks but the sign of the potential impact of risk events is normally the opposite. The interest rate structure at a given date reflects the overall evaluation by the market participants of all these risk factors.

The term structure of interest rates is defined as the pattern of interest rates on bonds with different maturities at a given time. The term structure of interest rates has been subject to studies by outstanding economists for many years. In the 1930s and 1940s John Maynard Keynes, John R. Hicks, Irwin Fisher, Frederick R. Macauley and Friedrich A. Lutz contributed with important publications. They wanted to explain the structure of prices on fixed-income securities as well as the links between monetary policy and real economic activity. Central banks operate traditionally mainly in the market for short term instruments, while real economic activity is assumed via the investment behaviour of firms to be related to long-term interest rates. It is therefore – also from a monetary policy perspective – crucial to understand the factors which influence the relative yields on securities with different maturities. *B.G.Malkiel* and *Angelo Melino* have, in 1966 and 1988 respectively, published excellent overviews of the development of interest rate structure theory (Malkiel, 1966 and Melino, 1988). According to the "Expectations Hypothesis Theory" forward interest rates are determined by the expectations of the market participants concerning the future development in short-term interest rates plus an appropriate risk premium. Disagreement on how to model expectations has been widespread. Some authors but not all have adopted the assumption of "Rational expectations" (Muth, 1961). In the absence

of rational expectations, the expectations hypothesis implies that term premia are time invariant. When rational expectations are adopted, the implication is that the term premia are increasing with maturity. In 1962, (Meiselman, 1962) defended the expectations hypothesis. He argued that one could not conclude from poor forecasts based on forward rates that they did not represent the market's interest rate expectations. Most empirical studies including an influential study by *J.Y. Campbell* and *R. Shiller* show that the steeper the interest curve is, the higher is the expected excess return on bonds with long maturity. (Campbell and Shiller, 1991). It is thus difficult to support the expectations hypothesis empirically. Based on the idea that the term structure should be based on absence of arbitrage opportunities, (*Vasicek*, 1977) developed a single-factor model in which the short-term interest rate is assumed to follow a stochastic process. His model was later expanded with additional factors by (Dai and Singleton, 2000). In recent years, investment banks have used stochastic interest rate structure models for pricing not only of bonds with different maturities but also of interest related derivatives such as bond options. The main idea behind arbitrage-free pricing is that any derivative can be replicated by a dynamic trading strategy in the underlying assets and that the value of the derivative is equal to the replicated portfolio. Derivatives markets are discussed in Chapter 13 of the present volume.

There are other theories about the interest rate structure than the expectations theory and the theories based on arbitrage-free models. The "Liquidity Preference Theory" with roots going back to Keynes and Hicks, argues that the maturity premium is determined by the maturity preferences of respectively investors and borrowers in the market. *James Tobin* was awarded the Nobel Prize in Economics in 1981. In the motivation by the Nobel Prize Committee, the 1958 article (Tobin 1958) is accentuated because it combines Keynes's liquidity preference theory with Markowitz's portfolio theory. Investors have a preference for short term assets because of their high liquidity, but they are ready to buy long-term bonds if they are compensated by a higher interest rate. In contrast, borrowers tend to prefer long-term debt and are ready to pay a higher interest rate in order to establish a more permanent debt structure. The interest rate structure observed in the market reflects the relative importance of the strength of these preferences among the two groups. In 1967, *F. Modigliani* and *R. Sutch* integrated several of the elements of the models (Modigliani and Sutch, 1967) in a so-called "Preferred Habitat Hypothesis". They explained how heterogeneous groups of borrowers and lenders preferred securities of different maturities.

Many studies of the term structure of interest rates have ignored credit risk. The interest rates observed in the market reflect, however, also the perceived probability of losses in case the bond issuers default on their contractual payments of principal and interest. The portfolio decisions by the investors determine market risk premia for the circulating bonds. Investors do not often

make their own estimates of probabilities of losses on bonds. Many investors rely on credit ratings provided by rating agencies as Moody' Investor Service, Standard & Poor's or Fitch Ratings. Bond issuers pay the agencies a fee for this service. Institutional investors subscribe to current information from the rating agencies. If rated bond issuing companies, banks or Governments come into financial difficulties, the agencies can downgrade them and this may cause the investors to sell their bonds. Portfolio managers in insurance companies, pension funds and other institutions are often instructed by their boards to invest in only high-rated bonds. The presence of such institutional restrictions on portfolio investments has an impact on the interest rate structure, which has been called a "Market segmentation effect" (Van Horne, 1990).

5.2.4. Capital Structure Theory

Franco Modigliani and *Merton H. Miller* published in 1958 an article on the irrelevance of a firm's capital structure in an abstract economy without transaction costs and taxation (Modigliani & Miller, 1958). The message of the authors was that the value of a firm defined as the sum of the market values of its equity and its debt is independent of the size and composition of the debt, if financial markets are perfect and in equilibrium. Under these ideal conditions, the average cost of capital is also independent of the leverage of the firm. The explanation of this surprising theorem is that the shareholders under the given assumptions are able, without any cost, to compose their portfolios in such a way that they realise the return/risk profile, which they prefer. When investors can do this themselves, they have no incentive to pay more for shares in companies, where the managers try to adjust the capital structure according to what they think the shareholders want. The "Irrelevance Theorem" had a strong influence on later contributions to capital structure theory in the 1960s and 1970s, where researchers focussed on the importance of taxation, transaction costs, cost of default etc. i.e. all the financial market characteristics that had been assumed away by Modigliani and Miller. Almost all researchers felt obliged to refer to the 1958 article and to explain why a firm's capital structure within their model framework was relevant.

The irrelevance theorem has been criticised by another Nobel Prize winner *Joseph E. Stiglitz* (Stiglitz, 1969). Modigliani and Miller assumed that there was no default risk and that there were no information asymmetry problems between the investors and the company managers. These two assumptions are according to Stiglitz unrealistic and if they are removed, the capital structure becomes important. It becomes then possible to discuss a company's funding decisions and the interplay between shareholders, creditors and company managers and the implied corporate governance problems in a much more relevant way.

Stewart C. Myers has written an excellent overview article on other capital structure theories (Myers, 2001). He explains the "trade-off theory", which says that firms seek debt levels that balance the tax advantages of additional debt against the costs of possible financial distress. The "Pecking order theory" argues that the firm will borrow, rather than issuing new equity, when internal cash flow is not sufficient to fund capital expenditures. Firms prefer internal to external finance in order not to be dependent on creditors or new shareholders. Finally, the "Free cash flow theory" says that the choice of capital structure is related to the conflicts between managers and shareholders. The owners might prefer higher dividend payments if the company has a good liquidity, but the managers prefer to keep the money in the company and invest in internal expansion. Thus, there are close relations between some capital structure theories and agency theory.

5.2.5. Agency Theory

One of the most frequently quoted articles in the finance literature is an article by *Michael C. Jensen* and *William H. Meckling* (Jensen and Meckling, 1976). In the article, the two authors develop a theory of ownership structure for the firm. Referring to the long discussion of separation of ownership and control of listed companies, they analyse the implications of potential conflicts of interest between company managers, shareholders, creditors and other company stakeholders. Agency relationships arise when persons (principals) engage other persons (agents) to perform some service on their behalf, which involves delegating some decision making authority to the agents. The contract between the parties will typically contain a set of incentives in order to limit divergences between their interests. In order to ensure desirable outcomes, the principals will also pay monitoring costs and bonding costs. Issues associated with the separation of ownership and control are intimately associated with agency problems. It follows that capital structure theory and agency problems are related. Jensen and Meckling investigate the incentives faced by the parties involved.

A company can be seen as a nexus for a set of contracting relationships among individuals. The firm is a legal fiction, which serves as a focus for a complex process in which the conflicting objectives of individuals are brought into equilibrium within a framework of contractual relations.

Agency theory has inspired many contributions to the corporate governance literature and the regulation of listed companies. The analysis of potential conflicts of interest supports the formulation of rules concerning shareholder rights, investor protection, disclosure and transparency.

Asymmetric information is important for the distribution of power between managers and shareholders, because managers always know more about the company

than the external owners do, but asymmetric information plays a broader role in financial markets. *George Akerlof,* published in 1970 a very influential article on the market for "Lemons", which is American slang for bad used cars (Akerlof, 1970). In the market for used cars, the seller is almost always better informed than the potential buyer. The price will typically reflect the average quality of similar cars in the market, which is higher than the value of a lemon. So the owner of the bad used car is happy to sell. In contrast, owners of good used cars will not want to sell. Consequently few good used cars will be offered at the market. The bottom line is that the market for used cars will not function well.

The "lemons problem" arises often in financial markets. Sellers of financial assets or products are as a rule better informed than potential buyers. A buyer of a corporate bond is willing to pay a price for the bond which reflects the average default risk of similar companies. Decision makers in well-run companies with a very low default risk will, however, not want to sell bonds at a price, which they know is too low. It is therefore unlikely that good companies will want to borrow in the market. In contrast, high-risk companies will want to offer their bonds. If bond investors are aware of this, they will probably look for alternative investment opportunities. The bottom line is that the market for corporate bonds will not function well.

Adverse selection problems in financial markets due to asymmetric information can be reduced in several ways. Rating agencies can provide potential investors with analyses of bond issuing companies and classify those companies according to credit worthiness. After the financial crisis, the market's confidence in the objectivity of ratings has been shaken, and regulatory steps concerning the rating agencies are under way. As discussed in Chapters 7 and 8 in the present volume, politicians, financial regulators and supervisors can apply disclosure rules to force firms to give reliable information about themselves to the market. This can reduce but not remove information asymmetry.

5.2.6. Efficient Market Theory

The "Efficient Market Theory" (EMT) states that the prices of securities in financial markets reflect all information, which is available to the investors. An early contribution to EMT is an article by *Sidney Alexander* in a book on the random character of stock prices (Alexander, 1964). Market efficiency can be tested in different ways. A test for "weak-form efficiency" uses only past price data in order to predict future prices of the financial asset in question. In a test for "semi-strong-form efficiency", the information set is expanded to include not only past price data but all publicly available information. Finally, a test for "strong-form efficiency" includes not only publicly available information but

also insider information, which can be possessed by company managers, employees, bankers and auditors. *Eugene F. Fama* has written a famous survey article on tests for market efficiency (Fama, 1970).

EMT is important in the context of investment advice and portfolio management. If EMT holds in the semi-strong form, investors or advisers without inside information are unable to find unexploited profit opportunities through securities trading. EMT also implies that the use of technical analysis to predict future stock prices is waste of time. EMT is also important in the context of disclosure requirements for listed companies and rules concerning insider trading. Press releases with new information about companies' growth or profit expectations must be given to the market participants simultaneously in order to minimise problems of asymmetric information.

EMT assumes that investors are rational. This implies that they currently follow the flow of information, which is relevant to the pricing of the securities they hold. It implies also that they currently adjust the composition of their portfolios, when new relevant information is disclosed. In the real world, it is, however, not easy to define what relevant information is. Every day, investors and their advisors are confronted with an enormous amount of new information, which may or may not have an influence on the pricing of the financial assets they own or have the opportunity to buy. Investors may have ideas about the effect of new events or political decisions on their portfolios, but they can never be sure and errors are unavoidable. Fischer Black has described investors that react to random and unpredictable shocks and try to profit from them as "Noise traders" (Black, 1986). It is probably realistic to interpret the actual stock price development and volatility as the combined result of the behaviour of rational investors, who follow the "fundamentals" i.e. profit announcements, dividend announcements and other disclosures from listed companies, and noise traders, who try to profit from any kind of new information that they believe to be relevant. It is also important to evaluate the realism of the EMT in the light of transaction costs. If rational investors decide to adjust their portfolios because new information has affected their expectations, they must pay fees to their bank or stock broker, bid-ask spreads and other transaction costs. The existence of these costs may cause some inertia in the portfolio composition and delay market reactions to new information.

5.2.7. Option Pricing Theory

In 1973, *Fischer Black* and *Myron S. Scholes* published an article (Black and Scholes, 1973), which revolutionised financial theory and laid the foundation of a phenomenal growth in derivatives markets in the following decades. The

so-called "Black-Scholes Formula" determines the value of a European call option as a function of the exercise price, the market price of the underlying asset, the time distance to exercise, the risk-free interest rate and the volatility of the underlying asset. The formula is based on the assumption that investors are able continually to adjust their portfolios. Since investors cannot do that in practice, the formula is an approximation. In spite of the simplifying assumptions, the formula has proved to be highly useable in the real world. It is today applied on all markets for derivatives in the world. Information in annual reports from listed companies on the value of stock options awarded to members of the company management is in most cases based on the Black-Scholes Formula. In 1997, *Myron S. Scholes* and *Robert C. Merton* were awarded the Nobel Prize in Economics for their research. In cooperation with Black and Scholes, Merton expanded option pricing theory with a view to several practical applications. (Merton, 1973). He used the formula in capital asset pricing, management of pension funds and management of mutual funds. In 1993, Merton was one of the initiators in the establishment of the fund Long-Term Capital Management (LTCM), which, after heavy losses, was reconstructed through a crisis package in 1998. The LTCM failure was in itself a milestone in the sense that it showed that even highly qualified financial researchers could be responsible for financial distress. The failure provided important lessons to learn for financial regulators with responsibility for derivatives markets.

A common assumption behind the theoretical models explained above is that persons and institutions are assumed to behave in a rational way. They have a goal or a preference function and they try consistently through their decisions to optimise their income, wealth or utility within the possibilities they are confronted with in the financial market. In the field "behavioural finance", researchers question the rationality assumptions in conventional financial theory and try through a multidisciplinary approach to understand financial behaviour in the context of psychology, sociology, anthropology etc. In the 2012 volume of the Journal of Behavioral Finance, the authors write about psychological influences on market fluctuations, risk perceptions of investment products, risk-seeking behaviour of troubled firms etc. Some authors belonging to this group have argued that the recent unsatisfactory performance of the financial system documents that there is a need for a revolution in financial thinking (Gippel, 2012).

5.3. MILESTONES IN THE EUROPEAN REGULATION OF FINANCIAL MARKETS

Abolition of obstacles to freedom of movement of goods, services, capital and persons has been the aim of the European Economic Communities right from the

beginning. Approximation of the laws of the member states followed soon. Over the years, the legal construction of the EC and later the EU under the headlines trade liberalisation, freedom to provide services, the right of establishment and liberalisation of capital movements has fundamentally changed the legal framework within which financial markets in Europe operate. There are a very large number of EU measures, which directly or indirectly through implementation in the national legislation in the member countries determine this framework. Important milestones related to liberalisation of cross-border capital movements, deregulation and the introduction of the Euro are discussed in the Chapters 1, 3, 6 and 7 of the present volume. These political decisions and events have of course a profound impact on the number of investors and borrowers who have access to financial markets and on the currency dimension in financial instruments. In the present chapter, the focus will be restricted to a sample of the many EU measures that are related to organized financial markets as stock exchanges.

Of particular relevance in the 1970s and 1980s were the Admission Directive, the Listing Particulars Directive, the Interim Reports Directive, the Major Holdings Transactions Directive and the Insider Trading Directive.

The aim of the Admission Directive (79/279/EEC) was to remove obstacles to the interpenetration of securities markets that may be caused by divergent admission conditions on stock exchanges. Companies that wanted to list their equity securities on a stock exchange should fulfil a number of requirements concerning market capitalisation, publication of financial statements, negotiability of the securities etc.

The Listing Particulars Directive (80/390/EEC) prescribed detailed disclosure requirements that had to be fulfilled prior to approval of the listing. Companies should provide information on persons responsible for preparing the listing particulars and for auditing the financial statements, the capitalisation of the issuer, the principal business activities, assets and liabilities, profit and losses and business prospects.

The Interim Reports Directive (82/121/EEC) aims at keeping investors informed regularly about the current development in listed companies. One requirement was that semi-annual reports had to be published in widely distributed newspapers.

The Major Holdings Transactions Directive (88/627/EEC) aimed to provide publicity regarding transactions through which the control of listed companies could change between different investor groups. The Directive contained a number of thresholds that released the obligation to disclose information to the public.

The aim of the Insider Trading Directive (89/592/EEC) was to prevent abuse of information asymmetries among investors and company insiders. The Directive

required member states to prohibit any persons who have access to inside information from taking advantage of that information by trading in securities. The Directive also prohibits insiders from using the information to recommend trades by third parties.

In 1999 the European Commission launched an ambitious Financial Services Action Plan (FSAP) to integrate financial markets in Europe through new legislation. (European Commission, 1999). In March 2000, the Lisbon European Council agreed to implement the FSAP by 2005. Referring to the name of the Chairman of the Committee of Wise Men, Alexandre Lamfalussy, the plan followed a so-called "Lamfalussy Approach" and the legal documents issued under the FSAP were often referred to as "Lamfalussy Directives". The EU Directives, which were gradually adopted on the basis of this approach, fall into two categories: "Level 1 Directives", which set out framework principles, and "Level 2 Directives", which set out the implementation measures that allow these principles to be put into practice. Four "Level 1 Directives" have been adopted: 1) the Directive on Markets in Financial Instruments, 2) the Market Abuse Directive, 3) the Prospectus Directive, and 4) the Transparency Directive. All four are crucial parts of the legal framework within which European financial markets operate.

1) The Markets in Financial Instruments Directive (MiFID) (2004/39/EC), which amended Directives (85/611/EEC), (93/6/EEC) and (2001/12/EC), creates a "single passport", which allows investment firms to operate across the EU whilst ensuring a high level of protection for investors. The Directive applies not only in the European Union but also in the other member countries of the European Economic Area. In 2007, MiFID replaced the Investment Services Directive (ISD) (93/22/EEC). MiFID retained the principles of the "passport" introduced by the ISD but introduced the concept of "maximum harmonisation", which places more emphasis on home state supervision.

2) The Market Abuse Directive (MAD) (2003/6/EC) replaced the Insider Trading Directive (89/592/EEC). MAD is aimed at both preventing and punishing different forms of behaviour involving exploitation of inside information. It covers also manipulation of the market through dissemination of false information or various types of sham transactions. Issuers of listed financial instruments are obliged to make public disclosure of any inside information as soon as possible. Issuers are also obliged to keep updated lists of insiders i.e. people with access to inside information.

3) The Prospectus Directive (2003/71/EC) sets out the initial disclosure obligations of issuers of securities that are offered to the public or admitted to trading on a regulated market in the EU. Issuers are obliged to publish a prospectus, which must contain a summary which conveys the essential characteristics and risks associated with the issuer, any guarantor and the securities in a non-technical

manner. Some transactions are exempted from the obligations in the Directive. Offers of large denominated securities or with high minimum subscriptions addressed to qualified investors are exempted.

4) The Transparency Directive (2004/109/EC) requires issuers with securities admitted to trading on a regulated market in the EU to comply with obligations for periodic and ongoing financial and non-financial reporting. Issuers are obliged to publish annual and semi-annual reports containing IFRS financial statements, information on significant shareholders (owners with more than 5 % of the share capital) and to ensure effective dissemination to the public, throughout the EU, of information disclosed by the issuers in compliance with the Directive.

Since the implementation of the FSAP, the EU Commission has followed the progress made by the member states in transposing the "Lamfalussy Directives". On the Commission's website, the stage of implementation ("state of play") in individual countries of the different directives is regularly presented in large tables. The Commission has also commissioned a study of the economic impacts of the FSAP (Malcolm & Tilden, 2009). Progress towards harmonisation and convergence of the regulatory framework for financial markets has been significant. Transaction costs in cross-border transactions have been lowered and important steps towards a single capital market have been taken. However, the fact that some of the measures have the characteristic of being partial, optional or have minimal harmonisation provisions means that complete uniformity of regulatory conditions in the financial markets in the EU has not yet been achieved.

5.4. A HELICOPTER VIEW OF 50 YEARS OF FINANCIAL MARKET DEVELOPMENTS

Researchers have access to an incredible amount of data concerning the development of financial markets. Interestingly, however, financial market data spanning the whole 50 years are not so readily available. This reflects, on the one hand, that financial markets evolved gradually only, with some segments, such as derivatives markets, virtually being non-existent 50 years ago. On the other hand, it also reflects that awareness of the need for comprehensive financial market data sets also only evolved over time, with some international institutions, such as the Bank for International Settlements, the OECD or the IMF, and for the EU, the ECB, the European Commission and Eurostat playing key roles in this respect. Some of the European institutions producing statistics did not even exist before 1998.

Within the space of the present chapter, it is out of the question to try to summarise trends in all financial market segments in all countries. The authors have therefore decided to present in this section a "helicopter view" of the development of a few key financial variables in relation to GDP in a sample of major countries, while providing references to some useful sources on more detailed data and information in the annex to this chapter. The reader can also find some observations of important financial trends in the annex. An analogy might help to explain the approach chosen. In some maps of a country, there are only main roads between the biggest cities, while smaller roads and villages are ignored. Such maps are useful to get a rough overview of the country. Other maps provide detailed information on secondary roads and small cities, which is useful for local traffic. The graphs used below to provide the helicopter view of the financial market development correspond to the first category of geographical maps, while the references to more detailed sources in the annex correspond to the second category.

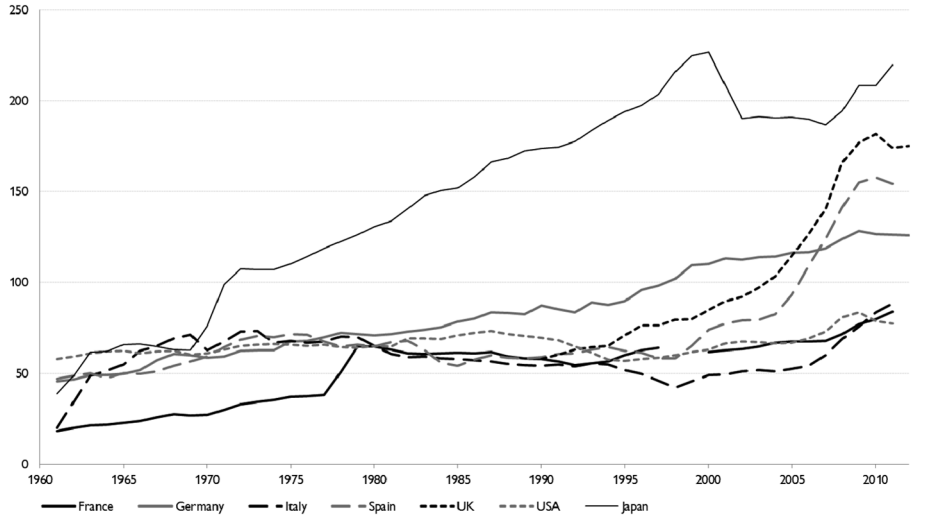
Goldsmith (1969) is the classical book on the relation between financial structure and development and economic growth. He decided to analyse how and to what extent differences in financial structure have been responsible for differences in the rate and character of economic growth. He used long time statistical series from 35 countries. Assets of financial institutions were confronted with GDP numbers in order to explain the interrelations between the financial sector and each country's aggregate production and income. Studies of a similar nature have later been made in particular by researchers attached to the World Bank (Demirgüç-Kunt & Maksimovic, 2002 and Demirgüç-Kunt, Feyen & Levine, 2011).

Since the 1960s, the aggregated level of financial assets has grown strongly and at the same time the structure of the financial system has changed. The relative importance of money markets, markets for bank deposits and loans, bond markets, stock markets and derivatives markets has changed.

Figure 5.1 shows the development since the 1960s in the ratio between aggregate bank deposits and GDP in a sample of important countries.

In all the countries included, GDP has grown over the five decades but with annual variations in the growth rate. The first observation to make in Figure 5.1 is that the bank deposit/GDP ratio has moved upwards in all countries through time. Growth in income and production has been accompanied by an even stronger growth in bank deposits that are owned by firms, households and financial institutions. *Goldsmith* uses the expression that the income elasticity of the issues of financial institutions is above unity. This seems still to be the case. There are country differences in the ratios in Figure 5.1. Already around 1970, the ratio begins to increase rapidly in Japan and in the late 1990s, the Japanese ratio

Figure 5.1: Bank deposits to GDP

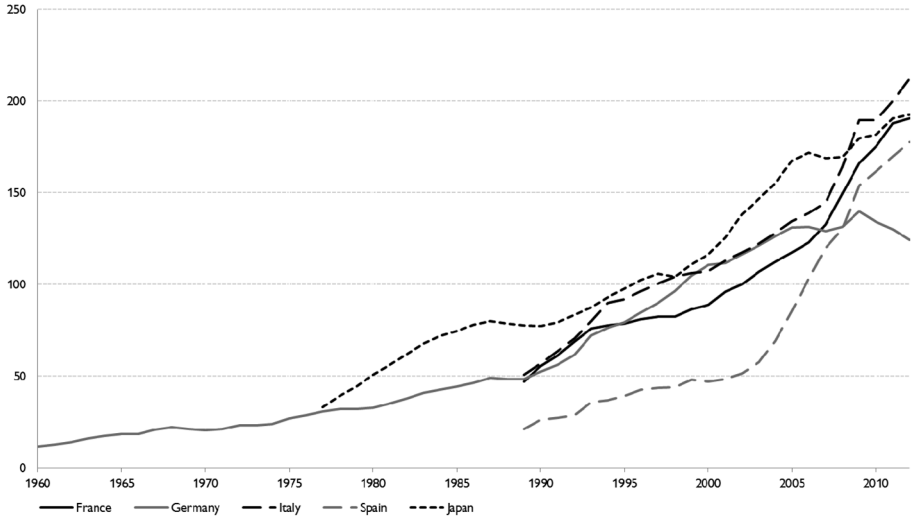


Source: The World Bank, OECD, Deutsche Bundesbank, Statistisches Bundesamt, Bank of England, ECB, own calculations.

exceeds 200 % of GDP. In the other countries, the bank deposit/GDP ratio shows a fast increase from a level of 50-100 % of GDP in the 1990s and reaching a peak around 2008.

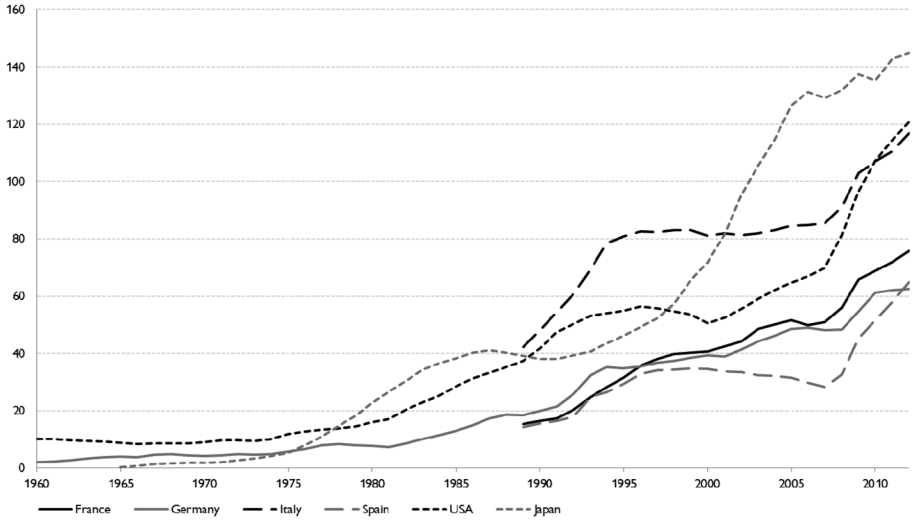
Figures 5.2, 5.3, 5.4 and 5.5 present data from the bond markets in five important countries. The ratio between the total amount of outstanding bonds and GDP has been increasing through time everywhere up to 2008.

Figure 5.2: Bonds outstanding to GDP



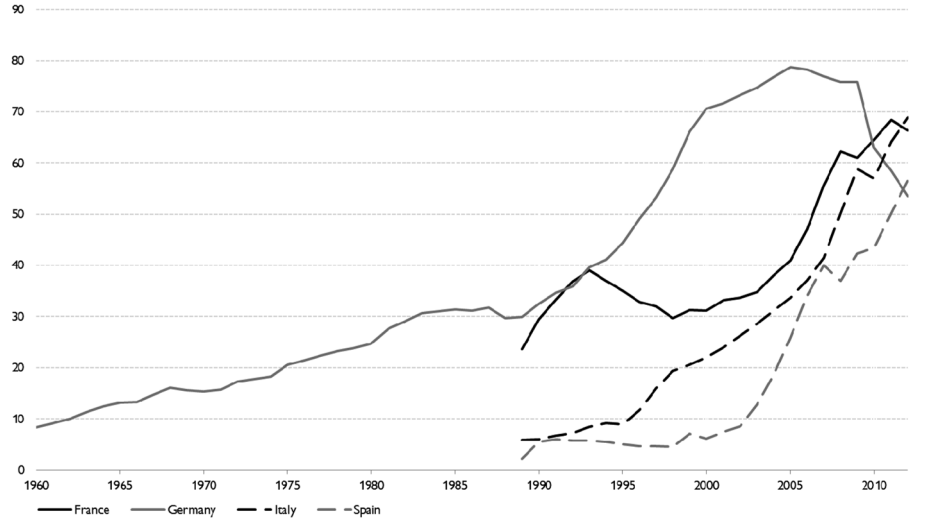
Source: ECB, Deutsche Bundesbank, Datastream, OECD, Statistisches Bundesamt.

Figure 5.3: Government bonds outstanding to GDP



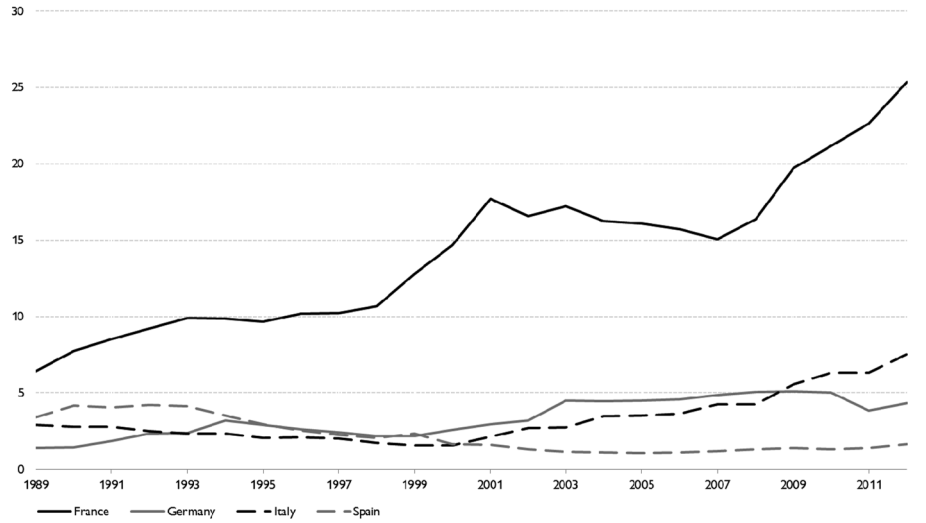
Source: ECB, Deutsche Bundesbank, Datastream, OECD, Statistisches Bundesamt.

Figure 5.4: MFI bonds outstanding to GDP



Source: ECB, Deutsche Bundesbank, OECD, Statistisches Bundesamt.

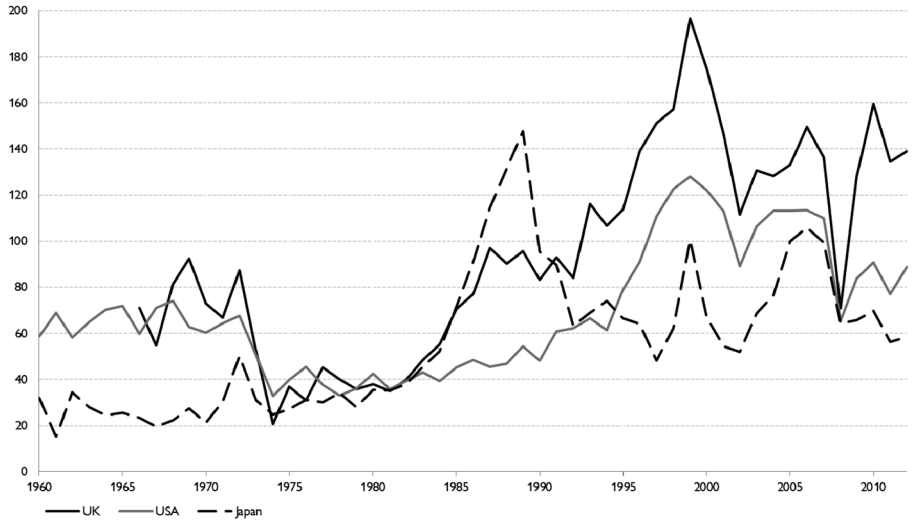
Figure 5.5: Non-financial corporations Bonds outstanding to GDP



Source: ECB, OECD, Statistisches Bundesamt.

In all countries except France, the growth in the ratio has continued after 2008. In 2010, the bond/GDP ratio was typically between 150 and 200 %. Figure 5.3 shows that the increase in the bond markets since the 1990s has been strongly affected by the issue of government bonds. At the end of the data period, the Japanese government bond/GDP ratio was above 140 % while the ratios for the other countries were between 60 % and 120 %. In Figure 5.4 it can be observed that the outstanding amounts of bonds issued by MFIs increased strongly from the middle of the 1990s but that a stagnation or decline started in 2008. Bonds issued by non-financial corporations have played a relatively modest role as it is documented in Figure 5.5. Figure 5.6 – Stock market capitalisation to GDP - shows by far the strongest volatility of all the graphs presented here.

Figure 5.6: Stock market capitalization to GDP

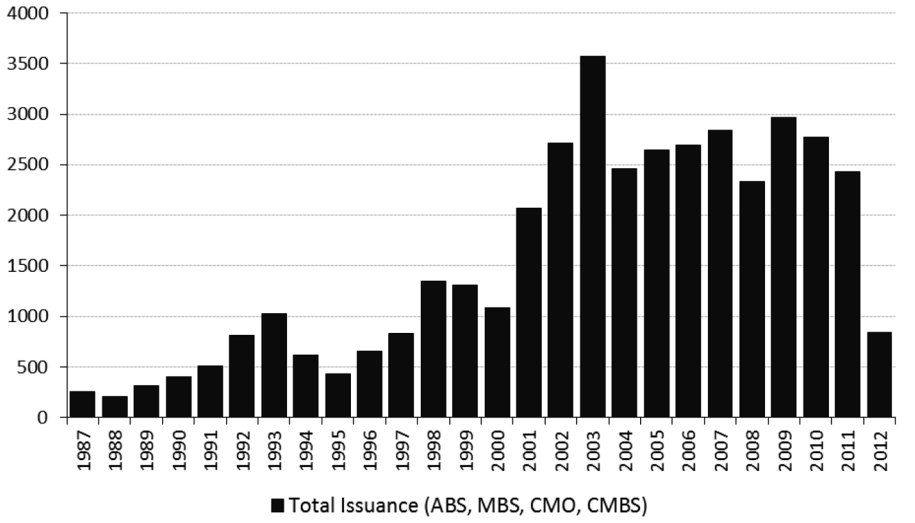


Source: Global Financial Data, OECD, Main Economic Indicators.

In the Anglo-Saxon countries, the ratio between stock market capitalisation and GDP lies traditionally at a much higher level than in the continental European countries. (Demirgüç-Kunt and Maksimovic, 2002). The observed volatility of the ratio in the figure is the combined effect of variations in GDP, increases and decreases in the equity capital of listed companies, new listings and delistings and stock price volatility. Spectacular events such as the OPEC announcement of oil price increases in October 1973 have a strong impact on stock prices. The effects of the so-called "Black Monday" on 19 October, 1987 can also be observed. So can the burst of the dot com bubble in 2001. The stock market capitalisation/GDP ratios tend to rise in expansion periods as 1993-1998 and 2007-2008 and to fall when recessions occur. The curves are difficult to interpret as they

reflect both investor behaviour and the behaviour of the share issuing companies. Alan Greenspan coined the famous expression "irrational exuberance" to describe the mood of participants in the stock market. Robert J. Shiller wrote a best-selling book on the topic (Shiller, 2000). Andrew Crockett explained how stock market volatility presents a challenge to monetary policy (Crockett, 2001).

Figure 5.7: Structured Finance Issuance in United States (in USD billion)



Source: Securities Industry and Financial Markets Association

Asset-backed securities, mortgage-backed securities and other types of structured finance instruments developed very strongly after the year 2000. Figure 5.7 shows that the annual issuance in the United States of such instruments reached a peak of USD 3,500 billion in 2003 and remained around USD 2,500 billion until a strong decline took place after 2009. As explained in greater detail in Chapters 11 and 12, this dramatic development in the market for structured finance was a crucial element in the financial crisis.

5.5. LESSONS AND CHALLENGES CONCERNING FINANCIAL THEORY AND FINANCIAL MARKETS

5.5.1. Models are Simplified Approximations

Most of the models from financial theory are worked out from a normative perspective. The researchers try to explain what a rational decision maker should do in order to optimise his or her situation under the given market and institutional

circumstances. Some researchers go further and analyse equilibrium under the assumption that rational decision makers dominate the financial markets. In reality many decision makers do not optimise and many decision makers are not rational. This becomes evident when theoretical models are confronted with data. No model can capture reality completely. No matter how many resources there are used in order to develop convincing models that incorporate the most sophisticated theories and apply the most advanced estimation methods, models can never be more than simplified approximations of the real world. This does not mean that models are useless. The alternative to making decisions with models is to ignore what we know about behaviour, risk determinants and interrelations between financial institutions and other market participants. Thus, theoretical models can support private decision makers as well as policy makers, but both groups should be well informed about the assumptions and limitations of the models. Researchers and analysts should be obliged to explain the simplifying assumptions behind their models. The experience during the recent financial crisis shows that this obligation should include the limitations of statistical estimation techniques and the reliance of risk measures on the assumed form of distributions of crucial variables.

It follows from the text above that interest rates, exchange rates and asset prices are essential variables in financial theory. So they are in economic and monetary theory. This is illustrated by the fact that these financial variables are also discussed in most other chapters of the present volume.

They are, however, mostly discussed in the context of monetary policy, financial regulation and financial (in)stability. There are references to portfolio theory in Chapters 4, 7, 9 and 13. One illustrative example is found in the discussion of the monetary policy transmission channel – portfolio re-balancing – in Chapter 4. There are references to asset pricing theory in Chapters 4, 6, 7, 9 and 12, and in particular, for example, in relation to the discussion of market risk in Chapter 7. Interest rate structure theory is used or mentioned in almost all chapters. An important example is found in the discussion of credit default swaps in Chapter 13. Capital structure theory is referred to in Chapters 6, 7, 9, 10 and 11. The discussion in Chapter 6 of the implications of rising leverage in banks followed by a period with deleveraging is very illustrative here. There are references to agency theory in Chapters 8, 9 and 13. One example is the discussion of the role of monitoring in financial supervision and the need for good corporate governance of banks in Chapter 8. Efficient market theory is mentioned in Chapters 3, 6, 9 and 13. Thus, the increasing belief in the years up to the financial crisis in the efficiency of financial markets is mentioned in Chapter 3. There are references to option pricing theory in the Chapters 6, 9, 10 and 13. The importance of the development of option pricing theory for financial innovation and the emergence of credit derivatives is discussed in Chapter 9.

5.5.2. Liberalisation, Deregulation, Risk and the Role of Models

The past five decades have been characterised by liberalisation and deregulation. Different aspects of these two important trends are analysed in most chapters of the present volume. An important implication is that people and institutions have experienced more freedom. They have been allowed more and more to define and follow their own goals within the framework of laws and regulations. In deregulated financial markets, the market participants are allowed to try to maximise profits, wealth or utility or whatever goal they may have, and the market development must be understood as the result of their efforts to do so. Unconstrained optimal behaviour of investors, company managers, banks, institutional investors and households is exactly what financial theory is about. As mentioned, normative financial models aim at explaining what rational market participants should do in order to optimise their portfolio or their utility. A basic assumption in financial theory is that people react to incentives. Incentives play a role in all the research areas, which are listed above. The legal infrastructure is full of incentives. Below, an attempt is made to explain developments in the financial markets by combining incentives with financial models. Before that, however, some remarks are needed about the role of risk in financial markets.

The world is characterised by uncertainty and risk. People and institutions are confronted with risk in some form, whenever they make transactions in financial markets. Several financial markets and institutions provide opportunities to transfer risk. Due to financial innovation, these opportunities have been improved tremendously in the last five decades. Insurance companies owe their existence to the presence of risk-aversion. Even though informed people know that the average holder of an insurance policy over his lifetime will pay premiums that exceed the expected losses incurred, they still buy insurance. Banks also partly owe their existence to the presence of risk-aversion. Depositors are willing to accept an interest rate, which is considerably lower than the interest rate paid by borrowers to the bank. They do it because the bank carries the default risk on the borrowers.

Credit default swaps and other derivatives are designed to transfer risk between seller and buyer. Risk does not disappear, when it is traded. It is moved from one market participant to another at a price. Such risk transfers increase the welfare of the society as risk-averse market participants improve their own utility by paying risk-willing counterparties to carry the risk.

Some people are protected against risk in financial markets, because a majority of politicians want them to be. Deposit guarantee systems have been improved and expanded several times in the last decades. Risk-averse depositors support of

course deposit guarantees. But again: The risk does not disappear. It is moved to somebody else. If the deposit guaranty system is funded by contributions from the banks, they (i.e. their shareholders and or customers) will bear the losses. If the system is funded by the Government, the tax payers have to pay.

Risk-takers play an important role in financial markets. Banks carrying the default risk on their borrowers have a strong incentive to monitor the performance of them. Credit evaluation by bankers is indispensable. The wealth of shareholders is exposed to the performance of the companies in which they own stakes. They have an incentive to monitor the managers and board members and to intervene at shareholder meetings if things are going wrong. The corporate governance literature explains that shareholders have not only rights. They are also supposed to follow the companies and to influence them to do better. The whole concept "Market Discipline", which is applied in the Basel capital adequacy framework, relies on the behaviour of risk-exposed depositors and shareholders.

5.5.3. Substitution between Markets

Financial theory helps us to understand substitution between markets. The empirical evidence referred to in the present chapter documents that there in recent years has been a considerable substitution between markets for different types of assets. A fitting characterization is in most cases that market participants react to arbitrage incentives. The way they react can often be related to financial theory. Let us take a look at substitution between respectively: 1) bond markets and stock markets, 2) markets for foreign currency interbank deposits and domestic currency interbank deposits, 3) markets for individual shares and markets for shares in mutual funds, 4) markets for short-term bonds and markets for long-term bonds, 5) markets for on-balance sheet items and markets for off-balance sheet items, 6) property markets and bond markets, 7) bank loans and securitised assets, 8) institutionalised forms of saving for retirement and individual saving for retirement.

Concerning Substitution 1: More sophisticated investors hold a portfolio consisting of both bonds and shares. If they are risk-averse, bonds represent a large part of the portfolio. If they have more risk appetite, they own more shares. The trade-off between the two types of securities is affected by both return and risk evaluations. Portfolio theory provides a nice explanation of their substitution between bond and share markets. A decline in the market interest rate makes shares relatively more attractive and gives an arbitrage incentive to move more into shares. In the context of the capital asset pricing model, a lower risk-free interest rate reduces the slope of the capital market line, which makes the market portfolio of shares more attractive.

Concerning Substitution 2: The interest rate parity theory is explained in Chapter 6 of the present volume. In a highly integrated world, dealers in banks are supposed to react promptly to arbitrage incentives that may arise, when the difference in money market rates in different currencies adjusted for the premium or discount in the market for forward exchange becomes different from zero.

Concerning Substitution 3: When investors buy shares in individual companies, they are exposed to risks related to the dividends, profits and prospects of these companies. By investing in shares in mutual funds they can in accordance with portfolio theory diversify their portfolio. In periods with volatile share prices, risk-averse investors may prefer to contribute to the administrative costs of mutual funds in order to obtain portfolio diversification. The wealth under administration of mutual funds (UCITS) has increased considerably in recent decades. Several empirical studies have looked at the performance of mutual funds. A classical article is (Jensen, 1968). Most of the studies use American data. The majority of the studies conclude that after deduction of the costs of running the funds, they obtain a return in line with the relevant index. Fund managers seem to be able to realise a higher return than the market portfolio before costs, but that this from the point of view of the investors is neutralised by the costs of running the funds.

Concerning Substitution 4: Term structure theory is an important type of interest rate structure theory. When central banks conduct open market operations, they traditionally buy or sell securities in the short end of the bond market. This has an impact on the shape of the yield to maturity curve and creates arbitrage incentives for investors to adjust their balance between short-term and long-term bonds.

Concerning Substitution 5: Chapter 11 of the present volume deals with shadow banking. In the years up to the crisis, banks and securities firms sponsored structured off-balance-sheet investment vehicles that constituted a shadow banking system. One of the motivations for building these fragile structures was that they were associated with very modest capital requirements. The involved parties reacted to incentives to regulatory arbitrage.

Concerning Substitution 6: In statistical tables illuminating the balance sheets of institutional investors, it is documented that many of them own portfolios with a mix of financial assets and real estate. Typically financial assets dominate. The main features of their behaviour can probably be captured by portfolio theory. Their interest in portfolio adjustments between the property market and the bond market can therefore be assumed to reflect risk-return considerations. They follow closely the long-term interest rate on the bond market. If they find it appropriate, they can finance their real estate by mortgage debt as genuine real estate companies do. As explained in Chapter 7, booms and busts in property

markets and their spillover to markets for mortgage backed securities have played an important role during the recent financial crisis.

Concerning Substitution 7: Blommestein *et al.* (2012) wrote an article on the substitution between securitised assets and other assets. In the years prior to the crisis, securitisation was used at increasing scale for transfer of risks away from the banking sector to bond holders. As explained in chapter 11, the substitution from the market for bank loans to the market for securities could to some extent be considered as regulatory arbitrage. Global securitisation issuance peaked at an amount close to USD 4 trillion in 2006. The authors point out that securitisation issuance has slumped considerably recently. Many bond investors have left the market because of experienced losses on structured bonds of different kinds related to the US subprime crisis. In the view of the authors, the entire securitisation sector was unfairly tarnished by the fallout of the US subprime crisis. Not all securitised products are toxic and opaque. Statistics show that structured finance default rates have been much lower in Europe than in the US. In accordance with interest rate structure theory, the yield on low-rated securitised bonds increased in relation to higher-rated securities. Significant steps are now being taken to improve transparency of the market and adjust previously skewed incentives. If investor confidence can be re-established, the authors expect securitisation to return as an important channel for lending. While the level of securitised issuance declined during the crisis, the market for covered bonds was more resilient. Relatively high issuance has continued. This segment of the bond market benefitted from the perceived higher risk related to some sovereign bonds and a relatively favourable regulatory treatment. Bond investors like the built in protection with underlying loans ring-fenced and retained on the issuers' balance sheets. The switch from securitisation to covered bonds is analysed in more depth in Chapter 11.

Concerning Substitution 8: In almost all European countries, pension saving through pension funds, insurance companies and banks has for many years grown faster than individual saving for retirement. This is one of the explanations why households' pension related claims on institutions have increased more than individual saving deposits. The most important arbitrage incentive is here a favourable tax treatment of pension saving via institutions.

5.5.4. Other Applications of Financial Theory

Portfolio theory has also been useful in the context of capital adequacy requirements. Under the Basel II requirements, the eligible capital is a function of the Value-at-Risk of the held portfolio of marketable assets. Kaplanski and Levy (2013) have studied the impact of the Basel Value-at-Risk market risk regulation

on the investment policy of banks. They use portfolio theory in order to evaluate if this type of regulation may give an incentive to change the risk profile of the bank's portfolio. When a risk-less asset is available does VaR-based regulation induce the institution to reduce risk.

There are, however, also challenges in relation to portfolio theory. An obvious question when making the trade-off between return expectations and risk is how risk is measured. The Markowitz-model assumed that risk should be measured as the standard deviation of the portfolio return, i.e. by volatility. According to Sharpe, the investor could accept the more simple measure of beta. Jorion (2006) recommended the use of Value-at-Risk. Experience shows that investors relying on all three types of advice can suffer losses. In extraordinary times, the model assumptions concerning the shape of statistical distributions do not hold and the calculations can give misleading results.

Before the liberalisation of capital movements in the 1960s and 1970s, the portfolios of institutional investors and other investors were dominated by securities issued by companies and borrowers located in the home-country of the investors. Also in the first years after the introduction of more liberal rules for cross-border investments, many investors continued to look for local securities, which they knew better. So their portfolio choices were characterised by some "home-country bias". Gradually the investors became convinced may be by studying portfolio theory and capital asset pricing theory that international diversification could help them to better performance. Statistics on the currency and country composition of the portfolios of institutional investors show a growing tendency to internationalise the choice of securities. An interesting implication of this trend is that the international portfolio diversification benefits have been reduced somewhat. Some studies do also show that the interdependence between stock markets tends to be higher during crisis periods. (Avounyi-Dovi and Neto, 2004).

The relative importance of factors that influence the interest rate structure changes through time. An illustrative example is the changing interest rate structure of European government bonds since the 1990s. In the years prior to the introduction of the single currency, the interest rate differences in the market between bonds issued by Governments of the coming members of the Euro area narrowed gradually. The reduction of the interest rate differentials must be interpreted as a reflection of the expectation by the market participants that the EMU plans would actually be implemented. The currency risk was expected to disappear. After 2007, when the European fiscal crisis developed, interest rate differentials between bonds issued by Governments in peripheral euro member countries and Germany widened. This time, market participants under the influence of the rating agencies reacted to a perceived increase in the probability of default and/or exit from the euro area. The investors' concern for currency risk

went down in the period in which the euro was introduced and their concern for default by some governments went up during the fiscal crisis.

5.6. CONCLUDING REMARKS

The recent crisis documents that the performance of our financial system is unsatisfactory. In Europe, millions of particularly young people are unemployed. There are several causes, but weaknesses in the financial system are among them. Who has the responsibility for that? The present chapter deals with the participants in financial markets and researchers who have contributed to the development of financial theory in the last 50 years. It deals also with the legal framework for financial markets and the incentives that this framework provides for market participants. Substitution between markets is often driven by arbitrage incentives. So, when looking for the responsible people, financial practitioners, politicians, regulators and academics are all potential candidates. Most of the criticism has been directed at bank managers. This is in many cases justified. Compensation and other incentive systems in financial institutions have contributed to excessive risk-taking by bankers in a number of cases. This is, however, not the only explanation. Insufficient understanding of the risks they accepted on behalf of their bank is also important. In big institutions, the responsible board members have typically been provided by their staff of analysts with the output of complex financial models designed to capture the bank's risk-profile. They have accepted the advice based on model calculations as relevant decision support without asking for or understanding the assumptions on which the calculations were founded. Similar considerations seem to be relevant in relation to regulators. Financial innovation takes place in the research departments of big private financial institutions and at universities. Financial regulators are always behind regarding knowledge of the risk attributes of new financial instruments even when they use a lot of efforts to keep themselves up to date. Martin Hellwig has discussed the relation between financial innovation and the increasing risk in the financial system (Hellwig, 1996). He is concerned about the efficiency of the allocation of risks. Financial innovation has improved the scope for risk diversification. Derivatives have expanded the scope for reallocating all types of risk. As it is explained in Chapter 11 of the present volume, securitisation makes it possible to transfer risks to the security holders. This reduces the incentives of the arranging bank to carry out a credit worthiness analysis of the borrowers. When mortgages of different credit quality are combined in large packages, it becomes extremely difficult for investors (even for rating agencies) to evaluate the risk profile.

It is the task of analysts and researchers to analyse and understand. It is also their task to explain the results of their work to their superiors, colleagues, clients or students. Many have failed on both accounts. Above, contributions from many outstanding researchers in finance have been surveyed. They have developed impressive models. They have improved our understanding of financial markets and they have provided useful decision support to portfolio managers of various kinds. But some of them have also contributed to financial complexity and therefore indirectly to the crisis.

People react to incentives. As explained above, that important lesson of the last fifty years applies to bankers, depositors and investors. As mentioned in Chapter 8, it also applies to supervisors and regulators. It follows as an important lesson that considerations about incentives are of crucial importance when the framework for financial markets shall be designed. In this context, there has been limited focus on academics. Incentives are also relevant to them. Researchers at universities should have incentives to work with applications oriented research projects and to teach and consult in order to contribute to improving the financial literacy of market participants in the financial markets. Presently, practical relevance of research projects and communication of new knowledge to financial practitioners are not primary criteria in relation to promotions at universities. Perhaps they should be.

REFERENCES

AKERLOF, G., 1970, "The Market for 'Lemons': Quality Uncertainty and the Market Mechanism", *Quarterly Journal of Economics,* **84**, 488-500.

ALEXANDER, S., 1964, Price Movements in Speculative Markets: Trends or random Walks? In COOTNER, P. (Ed.), *The Random Character of Stock Prices,* MIT Press, Cambridge, Mass.

AVOUNYI-DOVI, S. & NETO, D., 2004, "Equity market interdependence: the relationship between European and US stock markets", *Banque de France, Financial Stability Review,* No. 4.

BLACK, F., 1986, "Noise", *Journal of Finance,* **41**, 529-43.

BLACK, F. & SCHOLES, M.S., 1973, The Pricing of Options and Corporate Liabilities, *Journal of Political Economy,* **81**, 637-54.

BLOMMESTEIN, H.J., HARWOOD, A., & HOLLAND, A., 2012, 'The Future of Debt Markets', *OECD Journal: Financial Market Trends,* (2011/2), 263-81.

CAMPBELL, J.Y. & SHILLER, R.J., 1991, 'Yield Spreads and Interest Rate Movements: A Bird's Eye View', *Review of Economic Studies,* **58**, 495-514.

CARNEY, R.W., 2001, "The Political Economy of Financial Systems", *Midwest Finance Association.*

COX, J., INGERSOLL, J. & ROSS, S., 1985, "An Inter-temporal General Equilibrium Model of Asset Prices", *Econometrica,* **53**, 363-84.

CROCKETT, A., 2001, "In search of anchors for financial and monetary stability", in BALLING, M., HOCHREITER, E.H. & HENNESSY, E. (Eds.), *Adapting to Financial Globalisation,* SUERF, Routledge, London. 5-14.

DAI, Q. & SINGLETON, K.J., 2002, "Expectation Puzzles, Time-Varying Risk Premia and Affine Models of the Term Structure", *Journal of Financial Economics,* **63**, 415-41.

DEMIRGÜÇ-KUNT, A. & MAKSIMOVIC, V., 2002, "Funding growth in bank-based and market-based financial systems: Evidence from firm level data", *Journal of Financial Economics,* **65**, 337-63.

DEMIRGÜÇ-KUNT, A., FEYEN, E. & LEVINE, R., 2011, "The evolving importance of banks and securities markets", *World Bank Policy Research Working Paper,* No. 5805.

DEMPSEY, M., 2013, "The Capital Asset Pricing Model (CAPM): The History of a Failed Revolutionary Idea in Finance?" *Abacus,* **49**, Special supplement issue (S1).

ENGEL, C. & RODRIGUES, A.P., 1989, "Tests of International CAPM with time-varying covariances", *Journal of Applied Econometrics,* **4**, 119-38.

EUROPEAN COMMISSION, 1999, *Financial Services: Implementing the Framework for Financial Markets: Action Plan,* COM (1999) 232.

FAMA, E.F., 1970, "Efficient Capital Markets: A Review of Theory and Empirical Work", *Journal of Finance,* **25**, 383-416.

GILLIGAN, G., 1992, "Historical Touchstones in the Regulation of the Financial Services Sector", *Journal of Regulatory Law and Practice*, **1**, No.1, 63-71.

GIPPEL, J.K., 2013, "A Revolution in Finance?" *Australian Journal of Management,* **38**, No.1, 125-46.

GOLDSMITH, R.W., 1969, *Financial Structure and Development,* Yale University Press, New Haven and London.

HELLWIG, M.F., 1996, "Financial Innovations and The Incidence of Risk in the Financial System", in BRUNI, F., FAIR, D.E. AND O'BRIEN, R. (Eds.), *Risk Management in Volatile Financial Markets,* SUERF, Kluwer Academic Publishers, Dordrecht, Boston & London. 25-39.

JENSEN, M.C., 1968, "The Performance of Mutual Funds in the period 1945-64", *Journal of Finance,* **23**, 389-416.

JENSEN, M.C. & MECKLING, W.H., 1976, "Theory of the Firm: Managerial behaviour, Agency Costs and Ownership Structure", *Journal of Financial Economics,* **3**, No.4, 305-60.

JORION, P., 2006, *Value at Risk: The New Benchmark for Managing Financial Risk,* 3.Ed., McGraw-Hill, New York.

J.P. MORGAN/REUTERS, 1996, *RiskMetrics – Technical Document,* 4.Ed, New York and London.

KAPLANSKI, G. & LEVY, H., 2013, "Value-at-Risk capital requirement regulation, risk taking and asset allocation: a mean-variance analysis", *European Journal of Finance,* **19.**

KRITZMAN, M., 2011, "The Graceful Aging of Mean-Variance Optimization, *Journal of Portfolio Management,* **37**, No. 2, 3-5.

MALCOLM, K., TILDEN, M., & WILSDON, T., 2009, *Evaluation of the economic impacts of the Financial Services Action Plan,* CRA International, London.

MALKIEL, B.G., 1966, *The Term Structure of Interest Rates: Expectations and Behaviour,* Princeton University Press, Princeton, NJ.

MARKOWITZ, H.M., 1952, "Portfolio Selection", *Journal of Finance,* **7**, 77-91.

MARKOWITZ, H.M., 1991, *Portfolio Selection: Efficient Diversification of Investments,* 2nd Ed., Basil Blackwell, Cambridge MA & Oxford, UK.

MEISELMAN, D., 1962, *The Term Structure of Interest Rates,* Prentice-Hall, Englewood Cliffs NJ.

MELINO, A., 1988, "The Term Structure of Interest Rates: Evidence and Theory", *Journal of Economic Surveys,* **2**, No.4, 335 ff.

MERTON, R.C., 1973, "Theory of Rational Option Pricing", *Bell Journal of Economics and Management,* **4**, No.1, 141-83.

MERTON, R.C., 1973a, "An Inter-temporal Capital Asset Pricing Model", *Econometrica,* **41**, 867-87.

MILLER, M.H., 1999, "The History of Finance: An eyewitness account", *Journal of Portfolio Management,* Vol. 25, No 4, Summer, 95-101.

MODIGLIANI, F. & MILLER, M.H., 1958, "The Cost of Capital, Corporation Finance, and the Theory of Investment", *American Economic Review,* **48,** No.3, 261-97.

MODIGLIANI, F. & SUTCH, R., 1967, "Debt management and the term structure of interest rates: an empirical analysis of recent experiences", *Journal of Political Economy,* **75**, 569-89.

MUTH, J.F., 1961, "Rational expectations and the theory of price movements", *Econometrica,* **29**, 315-35.

MYERS, S.C., 2001, "Capital Structure", *Journal of Economic Perspectives,* **15**, No.2, 81-102.

ROLL, R., 1977, "A critique of the asset pricing theory's tests: On past and potential testability of the theory", *Journal of Financial Economics,* **4**, 129-76.

ROSS, S.A., 1978, "The current status of the capital asset pricing model (CAPM)", *Journal of Finance,* **33**, 885-901.

SAITO, A.T., SAVOIA, J.R.F. & FAMÁ, R., 2013, "Financial Theory Evolution", *International Journal of Education and Research,* **1**, No.4, 1-18.

SHARPE, W.F., 1964, "Capital Asset Prices – A Theory of Market Equilibrium Under Conditions of Risk", *Journal of Finance,* **19,** No.3, 425-42.

SHILLER, R.J., 2000, *Irrational Exuberance,* Princeton University Press, Princeton and Oxford.

SHILLER, R.J., CAMPBELL, J.Y. & SCHOENHOLTZ, K.L., 1983, "Forward rates and future policy: Interpreting the term structure of interest rates", *Brookings Papers on Economic Activity,* No.1, 173-217.

STIGLITZ, J.E., 1969, "A Re-Examination of the Modigliani-Miller Theorem", *American Economic Review,* **59**, No.5, 784-93.

TOBIN, J., 1958, "Liquidity preference as behaviour toward risk", *Review of Economic Studies,* **25**, 65-86.

VAN HORNE, J.C., 1990, *Financial Market Rates and Flows,* Prentice-Hall International, Englewood Cliffs, NJ.

VASICEK, O.A., 1977, "An Equilibrium Characterization of the Term Structure of Interest rates", *Journal of Financial Economics,* **5**, 177-88.

WEHINGER, G., 2012, "Bank deleveraging, the move from bank to market-based financing, and SME financing", *OECD Journal: Financial Market Trends,* (2012/1), 65-79.

ANNEX TO CHAPTER 5: SOME USEFUL REFERENCES TO FINANCIAL MARKET DATA

This annex offers detailed references to websites, where comprehensive and up-to-date, charts and tables are accessible. The annex also includes a few observations of recent important financial market trends. Currently updated detailed empirical information about financial markets can be found on the websites of ECB, BIS, Eurostat, OECD, IMF, the World Bank, World Federation of Exchanges and national central banks and statistical offices.

Annex 5A.1. ECB Monthly Bulletin and ECB Statistical Data Warehouse

At the time of writing, the latest available version of the ECB Monthly Bulletin is from July 2013, with each month's Monthly Bulletin available at www.ecb.int/pub/mb/html/index.en.html. Longer runs of data are available in the Statistical section of ECB's website. The reader can also access ECB's Statistical data Warehouse on http://sdw.ecb.europa.eu. One should be aware of the fact that series on financial market statistics for the euro area cover those EU member states that had adopted the euro at the time to which the statistics relate. Statistics on securities issues is an exception to this, however. In the statistical section of the July 2013 Monthly Bulletin, Chapter 4 deals with financial markets (page S35 ff.). In Section 4.1. with data starting in the 1990s one can find tables and graphs with information on securities other than shares classified by original maturity, residence of the issuer and currency. It can be observed in the tables and graphs in the July 2013 version that total gross issues of securities had their maximum in 2008, but that the total outstanding amount grew until spring 2013. Section 4.2. contains a sectoral breakdown of outstanding amounts, gross issues and net issues for issuers resident in the euro area in line with the ESA 95. In recent years outstanding amounts have been dominated by issues by MFIs (including the Eurosystem) and issues by Central Governments. The long period with fiscal deficits in Europe is reflected in the tables in Section 4.3. that show a strong increase in the growth rate of issues by general governments in particular from 2008 to 2011. After 2011, a decline in this growth rate can be observed. The growth rate of Government short-term securities has even become negative since 2010. The growth rate of issues by non-MFI corporations peaked in 2009 and declined fast towards zero from 2010 to 2012. Recently the interest of non-financial companies in borrowing in markets for corporate bonds seems to have risen. Section 4.4. shows the outstanding amounts of quoted shares issued by euro area residents broken down by issuing sector. Since 2008, the growth rates for quoted shares issued by MFIs have been very volatile. The numbers are to some

extent influenced by the structure of the bank rescue packages, which are discussed in some detail in the Chapters 9, 10 and 12 of the present volume. Section 4.5. presents statistics on all the interest rates that MFIs resident in the euro area apply to euro-denominated deposits and loans vis-à-vis households and non-financial corporations resident in the euro area. Euro area MFI interest rates are calculated as a weighted average of the euro area countries' interest rates for each category. The interest rate statistics are broken down by type of business coverage, sector, instrument category and maturity, period of notice or initial period of interest rate fixation. The interest curves for the last ten years all show a similar pattern. From 2004 until the autumn of 2008 interest rates of deposits and loans increase year after year. After 2008 and until late 2009, all interest rates show a dramatic decline and in the following years a modest increase. Section 4.6. presents money market interest rates for the euro area, the United States and Japan. For the euro area, a broad spectrum of money market interest rates are covered, ranging from interest rates on overnight deposits to those on twelve-month deposits. In January 1999 the basis of the interest rate data was changed. Before January 1999, all series were based on LIBOR, London Interbank Offered Rate. After January 1999, euro area interest rates on one, three, six and twelve-month deposits are based on EURIBOR. For the United States and Japan, interest rates on three-month deposits are still based on LIBOR. All the diagrams with money market interest rates show a declining trend since the 1990s but with strong fluctuations. There are temporary peaks in 2001 and in the autumn of 2008. Since 2009, the diagrams document that we are living in a low-interest world. Chapter 4 on unconventional monetary policy of the ECB during the financial crisis explains the background of this situation on the money markets. Section 4.7. shows end-of-period rates estimated from nominal spot yield curves based on AAA-rated euro-denominated bonds issued by euro area central governments. Fitch Ratings has provided the ratings used by ECB in the calculations. In most years, the euro area spot yield curves have been increasing with the maturity of the bonds. Changes in the shape of the yield curves over time have taken place and should be understood in the context of the use of monetary policy instruments. Of particular importance is the balance between short-term and long-term securities in the central bank's open market operations. The reader is referred to the discussion of these topics in Chapters 3 and 4 of the present volume.

Annex 5A.2. Eurostat

Eurostat is the statistical office of the European Union. Its task is to provide the European Union with statistics at the European level that enables comparisons between countries and regions. When the European Community was founded in 1958, Eurostat became a Directorate General (DG) of the European Commission.

The European Statistical System (ESS) is a partnership between the Community statistical authority, which is the Commission (Eurostat) and the national statistical institutes (NSIs). The partnership also includes the EEA countries. The ESS functions as a network in which Eurostat's role is to contribute to harmonisation of statistics in close cooperation with the NSIs. The names and addresses of the national statistical institutes can be found on the ESS website at http://epp.eurostat.ec.europa.eu/portal/page/portal/pgp_ess/ess/ess_news, which can open the way to more detailed statistics on financial markets in the individual countries. The European Statistical Office Eurostat and the NSIs produce a broad series of statistical databases and tables of relevance to financial markets. In order to help users, Eurostat has developed a Data Navigation Tree[2].

In the list of contents on the website, tables are grouped by themes, and one of the themes is "Economy and finance". Relevant sub-items under this theme are interest rates and "Monetary and other financial statistics". The section on interest rates provides information on euro yield curves by maturity (1, 5 and 10 years), long-term interest rates, EMU convergence criterion series, long-term government bond yields, central bank interest rates, day-to-day money market interest rates, 3-month interbank interest rates and other short-term interest rates. The section on Monetary and other financial statistics has tables on the size and composition of the money supply, respectively M1, M2 and M3 and share price indices plus stock market capitalisation. Eurostat cooperates with ECB, and there is a considerable degree of overlap between the tables presented in ECB publications and in Eurostat tables and graphs. Many of the observations on recent trends in relevant series included in the preceding section on ECB's Monthly Bulletin can also be made on the Eurostat website. In both sources, there are detailed information on assets and liabilities of monetary financial institutions (MFIs), which are defined as financial institutions which together form the money-issuing sector of the euro area. In the tables, the MIFs include the Eurosystem, resident credit institutions, other financial institutions whose business is to receive deposits and/or close substitutes for deposits from entities other than MFIs and, for their own account, to grant credit and/or invest in securities, as well as electronic money institutions that are principally engaged in financial intermediation in the form of issuing electronic money, and money market funds, i.e. collective investment undertakings that invest in short-term and low-risk instruments. The broad monetary aggregate M3 comprises M1 (currency in circulation plus overnight deposits held with MFIs and central government), and M2 in which deposits redeemable at a period of notice of up to and including three months and deposits with an agreed maturity of up to and including two years are added to M1, plus marketable instruments, in particular repurchase agree-

[2] http://epp.eurostat.ec.europa.eu/NavTree_prod/everybody/BulkDownloadListing?file=table_of_contents_en.pdf.

ments, money market funds shares and units, and debt securities with a maturity of up to and including two years issued by MFIs. Tables with the components of M3 are useful in studies of the development in markets for bank deposits.

Annex 5A.3. BIS Quarterly Review

The BIS Quarterly Review's statistical annex contains rich statistics on the international banking market, securities markets and derivatives markets – the most recent edition having been published in June 2013. BIS's locational reporting system collects quarterly data on the gross international financial claims and liabilities of banks resident in a given country. The main purpose of the statistics is to provide information on the role of banks and financial centres in the intermediation of international capital flows. In Chapter 7 of the present volume, the creation and development of the Eurocurrency market which motivated this part of the BIS statistics is explained. The reporting system covers currently 44 countries. The tables provide, however, through data on counterparties relevant financial information from all over the world. The consolidated banking statistics report banks' on-balance sheet financial claims vis-à-vis the rest of the world and provide a measure of the risk exposure of lenders' national banking systems. The reporting technique allows the allocation of claims to the bank entity that would bear the losses as a result of default by borrowers. This information is of course very important to financial supervisors. The locational statistics has been produced quarterly since 1977, while the consolidated statistics has been produced quarterly since March 2000. While the locational statistics are appropriate for measuring lending flows in a given period, the consolidated statistics are more suited to gauging the size of banks' country and liquidity risk exposures. More detailed data can be found in BIS Quarterly Review www.bis.org/publ/quarterly.htm and a full set of historical time series are available on the BIS website under www.bis.org/statistics/bankstats.htm.

Since 1963, interbank markets have become more and more global. Under free short-term capital movements, the place of residence or nationality of a counterparty bank is unimportant for arbitragers in the individual banks. Normally, arbitrage ensures that the covered interest rate parity holds in combined spot and forward markets, as explained in Chapter 6 of the present volume. From the publication of BIS's interbank statistics started forty years ago, the tables on aggregated international positions, positions vis-à-vis all sectors, vis-à-vis other banks, vis-à-vis non-bank sectors, local positions, with and without currency breakdowns have been a major source of information. Successive tables with currency breakdowns of the reporting banks' cross-border positions document how the dominance of USD in the 1970s and 1980s has gradually been reduced and

the role of EUR has increased. Other important currencies in the international interbank market are GBP, JPY and CHF.

The section on securities markets in BIS Quarterly Review contain tables with a wealth of information on international debt securities issued by borrowers in developed countries, developing countries and off-shore centres. Detailed tables provide information on nationalities and residence of issuers and on maturity. There are separate tables for international debt securities issued by banks and other financial corporations. In recent years, banks resident in the United Kingdom, United States, the Netherlands, France, Italy and Germany have been the largest issuers of securities in the market. More detailed data and a full set of historical time series are available on the BIS website under www.bis.org/statistics/secstats.htm.

The BIS Quarterly Review provides finally a comprehensive overview of developments in derivatives markets. There are numbers for notional amounts outstanding and gross market values of the most important derivatives. In a table on amounts outstanding of OTC derivatives by risk category and instrument, the relative importance of different contracts can be followed through time. Ranked according to size as measured by notional amounts outstanding at the end of 2012, the most important contracts were respectively interest rate contracts, foreign exchange contracts, credit default swaps, equity linked contracts and commodity contracts. Within the category of foreign exchange derivatives, the largest items were outright forwards and foreign exchange swaps and options. The most important currencies used in (one side of) foreign exchange derivatives are USD, EUR and JPY. At the end of 2012, the aggregated notional outstanding amounts of OTC single-currency interest rate derivatives reached USD 489.703 billion. The largest contributions to this number came from swaps, then forward rate agreements and options. A currency breakdown of the amounts outstanding of OTC single-currency derivatives showed that contracts based on EUR were larger than USD, JPY and GBP. More detailed data and historical time series on derivatives are available on the BIS website at www.bis.org/statistics/derstats.htm. Developments in derivatives markets are analysed in Chapter 13 of this volume.

Annex 5A.4. OECD iLibrary

OECD provides subscription-based access to a rich set of data to users, via the internet. The main address of the relevant website is www.oecd-ilibrary.org. Subscribers must add their name and nationality in order to access the relevant material, in this context the finance and investment tables. This subset of the database consists of OECD Banking Statistics, OECD Institutional Investors Statistics, OECD Insurance Statistics, OECD International Direct Investment

Statistics, OECD Pensions Statistics and OECD Statistics on Measuring Globalisation. Banking statistics provide information on bank assets and liabilities, income statements and balance sheets. Institutional investor statistics include a detailed break-down of investment funds, insurance companies and pension funds, and other forms of institutional savings. Financial assets included correspond to the assets requested in the previous data base (prior to 1980) on institutional investors, i.e. currency and deposits, securities other than shares, loans, equities and other financial assets. Total non-financial assets are also included. Data are reported in millions of national currency and in current price terms.

OECD's insurance and pension statistics document the growing role of insurance companies and pension funds as sellers of protection against risks and old age benefits. The statistics also documents the role of these institutional investors in markets for bonds and property. Customers pay premiums in order to reduce or completely remove the risk, and the insurance companies accumulate reserves in order to be able to absorb the losses and to pay the expected claims to the policy holders. Pension funds provide benefits to the customers when they retire. Data from OECD is an important source, when the growing importance of insurance companies and other institutional investors in European capital markets is analysed.

Annex 5A.5. World Federation of Exchanges – Monthly Report

The global stock exchange structure has changed fundamentally since the 1960s. The number of independent national stock exchanges has fallen and multinational exchanges operating through entities in several countries play today a dominant role. The majority of the large exchanges are today members of WFE, World Federation of Exchanges. Research in markets for listed securities is facilitated considerably by the WFE-publications since the organisation is committed to issue reliable and comparable market statistics based on data provided by the member exchanges. The annual query tool allows retrieving data since 1975 and includes all the indicators published in the WFE annual report, some of which are only available on an annual basis. The relevant websites are www.world-stock-exchanges.net and www.world-exchanges.org/statistics/monthly-reports respectively.

Recently WFE published a 10 year review covering the years 2000 to 2009[3]. In the review, the growth during the decade in aggregated market capitalisation measured in USD trillions of listed shares in the member countries (+33%), the growth of the total value of share trading in all exchanges (+66%), the growth of the total number of trades (+700%), the total number of listings (+41%) and the

[3] www.world-exchanges.org/files/file/10 Year Review.doc.

volatile development in investment flows i.e. capital raised by issuing shares on the exchanges are documented. The growth rates of the WFE series have varied from year to year. Growth has not been monotonous. The explanation why the growth of the total number of trades has been much higher than the growth of the value of share trading is that the average size of transactions has fallen. This trend has been observed in all regions over the world. On the WFE website the organisation has also published the minutes of a 2008 workshop on market structure and statistics, in which the participants discuss the trends that affect the exchange industry. Among the relevant trends are the IT-evolution, improvements of electronic platforms, easier access to international market places, creation of new products, regulatory pressures (FSAP in Europe is mentioned here), the impact of the Euro, which has reduced currency risks for many market participants, increasing transparency across European countries, consolidation in the banking industry and the fact that competition is no longer limited to the group of exchanges themselves but also concerns new trading venues.

The most recent monthly report from WFE at the time of writing is the June 2013 report. It provides statistics on the domestic market capitalisation of shares in 54 member exchanges all over the world. The member exchanges are presented in three groups: The Americas, Asia-Pacific and Europe-Africa-Middle East. Aggregated by region, the market capitalisation at the end of June was in the Americas: USD 24,919 billion, in Asia-Pacific: USD 16,724 billion and in Europe-Africa-Middle East: USD 14,463 billion. The total figure for all WFE members was USD 56,106 billion. The monthly report has also tables showing the number of listed companies at the end of June 2013 (45,380 in total), the value of share trading in first half year of 2013 (USD 27,702 billion), the number of listed bonds at the end of June 2013 (148,090), the value of bond trading in first half year of 2013 (USD 12,161 billion) and statistics on derivatives markets from the member exchanges that provide trading facilities for options and other derivatives. At the end of June 2013, the total number of derivatives contracts traded on the exchanges was 326,838,157. The WFE website provides links to the websites of member exchanges where more information including numbers denominated in local currencies can be found.

Annex 5A.6. International Monetary Fund

The IMF provides a comprehensive set of statistics on financial markets through various channels, including the World Economic Outlook Databases, International Financial Statistics, Principal Global Indicators, the Financial Access Survey and Financial Soundness Indicators, many of which can be accessed free of charge at the IMF's website www.imf.org.

6. Integration versus Interdependence and Complexity in Global Trade and Finance in the Post-War Period

Adrian Blundell-Wignall, Paul Atkinson and Caroline Roulet[1]

6.1. Introduction

The focus of this study is an assessment of the trends in economic integration and rising financial interdependence during the post-War period – where the pressures came from, where they are taking the world economy and with what implications for economic performance.

When thinking about the openness of goods and financial markets, it is important to distinguish between integration and interdependence. Greater market integration carries with it the connotation of the opening up and expansion of trade in goods and services, with gains from trade likely to enhance economic welfare. Greater interdependence, however, is more ambiguous. More interdependent financial institutions and markets carry increased risk for financial instability, particularly with respect to counterparty positions in derivatives and repurchase (repo) agreements between global systemically important financial institutions (GSIFIs). Greater interdependence also increases the difficulty of responding to financial crises and economic imbalances through national policy making. Where appropriate and effective policy coordination is not feasible in the face of such events, the risk of winding back openness through regulations and controls becomes more likely.

A low degree of integration in goods and financial markets is usually associated with the presence of trade barriers and capital controls, supported by the suppression of financial markets. Historically such controls and regulations have been associated with attempts to fix or manage exchange rates. In the early post war years this resulted in a considerable degree of economic autarky, where national saving and investment were highly correlated, and current account imbalances largely absent. Real interest and exchange rates became distorted in the process of bringing this about, and arbitrage did not drive interest rates into covered parity. At the opposite extreme, a highly integrated world in which all goods are traded, transport and transactions costs are minimal, financial markets are rational and capital is perfectly mobile, covered interest parity (CIP) holds and

[1] All of the views expressed in this paper are those of the authors, and do not purport to represent the views of the OECD or its member governments.

national saving and investment need not be correlated. While policy makers debate the right sequencing of reform towards more integration, openness and less distorted markets, usually the freeing up of any one increases the pressure to free up the others. These pressures certainly became apparent during the post-War period in the West, but curiously have been resisted by many emerging markets to this day.

The apparent presence or absence of capital mobility can also be affected by factors other than official controls:

Foreign aid, government borrowing and the official recycling of global surpluses may also allow savings to diverge from investment for a time, and for current account imbalances to emerge – even where private capital flows are controlled by regulations; and

A sharp rise in risk aversion in response to financial crisis or a recession may actually reduce capital mobility even in the absence of trade barriers and capital controls: (a) risk premia may periodically drive a wedge into the CIP relationship, particularly where financial intermediary defaults may be a realistic possibility; (b) governments may impose prudential policies which act in the end as de facto capital controls; and (c) banks themselves may ring-fence domestic assets and liabilities and pull back from international activities.

Consequently, the interpretations of various indicators and/or tests of integration and openness have to be treated with extreme caution, given the complex interactions between policies, structural changes, geopolitical events (such as OPEC 1973-74), risk sentiment, and the greater or lesser openness of markets. Section 6.2. looks at goods and capital market integration trends in the post-War period. It looks at the main historical factors and uses analytical techniques to measure openness and deviations from it. The growing financial interdependence issues are examined in Section 6.3., which includes a new measure of financial firm linkages to the international macro/market cycle based on individual stock data – a global banking beta. This interdependence is linked with trends in derivatives and counterparty risk. Finally some concluding remarks are made in Section 6.4.

6.2. GOODS AND CAPITAL MARKET INTEGRATION TRENDS

6.2.1. Brief Summary of the Post-War Pre-1960s Period

The retreat from the European empires had begun by 1947 (with independence declarations in Indonesia and Indochina, and the announcements of British retreats from Palestine and India). With the exception for Portugal, this was substantially complete by the mid-1960s. These parts of the world were at a very

different stage of development, and began to form their own approaches to economic organisation. Within the West and the Soviet sphere, the War was a major influence. The question of what to do with Germany was discussed at Tehran and in subsequent diplomatic jockeying. The main questions were whether to leave Germany unified; break it up; allow it to re-industrialise; or de-industrialise it. In the end, Germany was broken up and Stalin integrated East Germany with other Soviet bloc countries under Russian hegemony, following the central-planned non-market system. West Germany was allowed to re-industrialise while maintaining its heavy industry with a non-military focus under the market system. Japan, too, was allowed to re-industrialise in non-military production lines under American occupation and the Western market-based system.

The work that led to the Bretton-Woods agreement had begun as early as 1942, with Roosevelt, Churchill and their spokespersons White (who was in fact a Soviet agent) and Keynes in the lead. The broad aim was an integrated trading world with adjustable pegged exchange rates, repressed financial markets (capital controls, exchange controls, credit and interest rate ceilings) to facilitate pegged exchange rates, while domestic demand management assured full employment.

On the real side, the Marshall Plan engaged the US in a cooperative development process, funding investment in Europe (catch-up capital broadening) often involving the licensing of US technology. The European Coal and Steel Community was the incarnation of the single market idea. The European Payments Union was administered under the Marshall Plan, and it facilitated the shift from bilateral trade agreements to a multilateral system. Imports had to be licensed and the clearing system required dollars or gold for payment. This was terminated in December 1958 with the restoration of current account convertibility. The re-industrialisation of Europe and Japan saw a prolonged boom in commodity prices, helping most of the developing countries, which were frequently dependent on a narrow commodity export base.

With respect to the financial system, the early years saw a severe shortage of dollars, as countries tried to rebuild their international liquidity (foreign exchange reserves) for participation in the Bretton-Woods System, and the use of dollars for the clearing of current accounts in Europe. In 1949 sterling was devalued, and other countries followed suit, helping non-US current account surpluses to emerge. The dollar shortage rapidly came to an end and, following the resolution of the Suez crisis of October 1956, which disrupted the oil market and slowed the outflow of dollars for a time, a dollar glut began to emerge. From 1958 many European countries began converting their dollars into gold. This period also saw the beginnings of the euro-dollar market, as the Russians (fearing confiscation by the US after the invasion of Hungary in 1956) began to hold their dollars in Britain in 1957 – that is, to hold euro-dollars in London.

The world by the 1960s had essentially split into three: the OECD integrated market (including Japan and West Germany); the centrally planned world led by Russia; and the third world countries that were not centrally planned, but which were significantly autarchic and did not rely on market arrangements due to high tariffs, border controls on trade, high levels of state-ownership of industry, and controls on foreign exchange and capital flows. This paper focuses mainly on the OECD and key emerging economies, notably China, India, South Africa, OPEC and some larger Latin American countries, which have become too important for any reasonable coverage of the issues to ignore. It does not try to analyse all the centrally planned economies over the longer time period considered here.

6.2.2. The 1960s to the 1980s: OECD Countries Open up

Within the OECD countries, there can be little doubt that Europe was the early mover in the trend towards greater integration. The Treaty of Rome in 1957/58 became the basic legal framework ultimately for the establishment of the E.U. single market. European current account convertibility came into effect in 1958 and the process of import licensing ended. By 1968 a full customs union was established, with tariffs and quotas on internal trade being abolished and a common external tariff on third countries coming into effect. This freeing up of trade within Europe should have contributed to a significant fall in the saving-investment (S-I) correlation from the late 1960s. However, trade liberalization proceeded much more slowly at the global level than it did in Europe. From 1948 the Global Agreement on Tariffs and Trade (GATT) led to more trade liberalization, mainly in the OECD area, with four "rounds" of multilateral negotiations completed by 1956 and a fifth by 1961. With the retreat of European empires, successive GATT rounds became more global, with participation rising from 26 countries in the Dillon Round to 62 in the Kennedy Round (starting in May 1964) and 123 in the Uruguay Round (the last to be completed in 1994). Major expansions of trade followed in each case. Capital account deregulation and the ending of financial repression of domestic financial markets were, on the other hand, notoriously much less rapid[2].

Propping up fixed or managed exchange rate regimes was one primary reason for not promoting faster financial integration. Persistent dollar weakness during 1958 to 1973 (despite current account surpluses for most of the period) led to US controls such as the interest equalisation tax (IET, 1963) and its shoring up by the voluntary foreign credit restraint (VFCR, 1965), foreign direct investment (FDI) limitations and extensive diplomacy to support the dollar. At the same time surplus countries, and notably Germany and Switzerland, imposed restrictions to

[2] See Bakker (1996) and Wyplosz (2001).

limit inflows, in order to reconcile the exchange rate regime with domestic monetary control. While in the early 1970s the USA, the UK, Denmark, France, Italy and Sweden invoked some new measures to control outflows, other countries (Germany, Switzerland, Austria, Japan, Australia and Finland) imposed new measures designed to prevent inflows.

The fixed exchange rate system fell apart definitively in 1973, leading to the floating of the major exchange rates. This coincided with a rapid rise in inflation nearly everywhere and the oil price shock in 1973-74, with OPEC achieving a much greater share of the economic rent from its cheap production costs. Most developed countries found themselves wrestling with inflation, high unemployment, huge budget deficits and large external imbalances. Heavy use of euro-currency markets to "recycle" oil surpluses followed, and there was strong official support for "recycling", notably through the IMF.

With the end of the commitment to fixed exchange rates the trend to financial repression and capital controls began to be reversed in the 1970s, a process which was accelerated in the 1980s by policy and structural changes that made regulations less effective. Central banks were formulating new approaches to monetary control, facilitated by separating their functions from the budget process and relying on market instruments. The extensive use of interest rate swaps, options, forwards and other derivatives separated the notion of exposure and capital flows across exchanges to which many controls applied. Institutional investors and international banks lobbied hard for deregulation to avail themselves of the increased range of products. Germany ended the repression of banks to prevent money from coming in by 1975 (see OECD (2002) and Dooley and Isard (1980)). The US removed capital controls in 1974, and the Depository Deregulation Act followed in 1980 (which phased out interest rate ceilings). The UK abolished all capital controls and foreign exchange restrictions in 1979. In 1980 Japan formally ended its capital controls in one move, after decades of deregulating slowly in small steps. By 1981-82 all of the four major currency countries liberalised exchange and capital controls and domestic financial markets. Other OECD countries soon followed.

From 1981 to 1983 the French under Mitterrand tried independently to stimulate via fiscal and monetary policy during the Volcker squeeze and restrictive German policies. This was followed by capital flight and the imposition of strict controls on outflows to defend the franc. However, recurrent crises in France forced them to change gear after 1983, and France moved to liberalise from 1983-84, completing the process by 1986[3]. Jacques Delors left the French government around this time and went to the EU Commission to complete the single market

[3] See OECD, (2002), for a full description of measures and dates.

project. The Single European Act was signed in 1986, committing countries to remove all controls on goods and capital by 1992. The Second Banking Directive came into effect in 1992 – while recognising national regulatory approaches, countries could no longer restrict entry into their domestic market. Australia and New Zealand signed the Closer Economic Relations treaty in 1983, freeing up all trade and capital restrictions. The USA signed a free trade agreement with Canada in 1987 and the North American Free Trade Association (NAFTA) added Mexico in 1994.

6.2.3. Measuring Integration via Interest Rate Parity

Closed interest parity states that capital flows in the absence of controls (transactions taxes, reserve requirements and withholding taxes) and country risk premia (associated with concerns about the solvency and/or the honouring of guarantees for of financial institutions) will equalise (except for transactions costs) interest rates on comparable financial instruments issued in different countries but denominated in the national currency. Figure 6.1 shows closed interest parity for interbank deposits issued in the USA, United Kingdom, Germany, France, Japan and Switzerland versus the euro-deposit interbank rates in the national currencies of each. Closed parity for Germany was achieved by the mid-1970s, and sterling deposits immediately after the removal of controls in 1979. In the case of dollar deposits, closed interest parity came about after the phased removal of Regulation Q ceilings and further capital controls from the early 1980s[4]. The deviations from parity during Mitterrand experiment in the early 1980s are very clear in the Figure. Japanese rates closed in towards parity from 1980, whereas Switzerland, while also removing securities restrictions in 1980, saw a move that reduced the gap, but which still saw Swiss banks having to bid significantly more offshore for deposits than onshore – a fact that may be related to a negative risk premium for onshore deposits for safe haven and tax reasons.

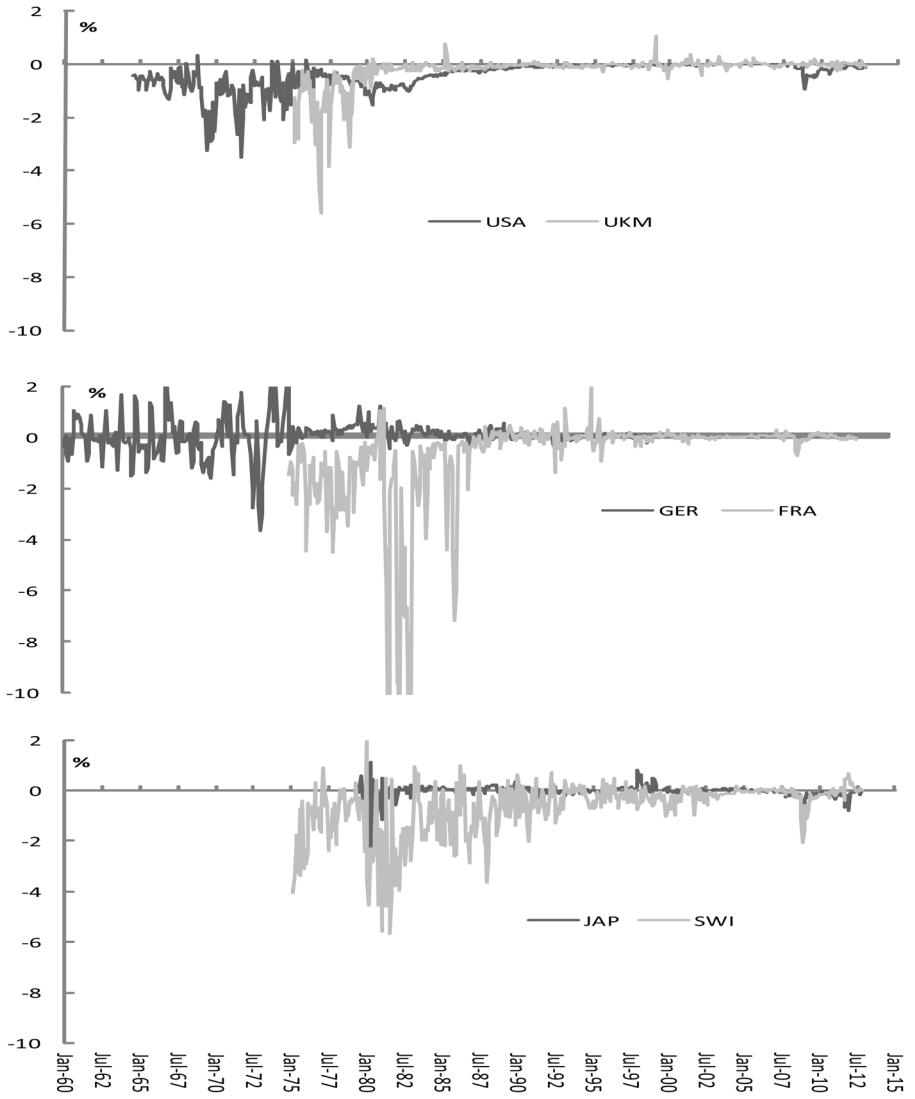
Covered interest parity shown in Figure 6.2 relates to the yields on comparable assets issued in different countries and denominated in different currencies but hedged to eliminate currency risk. Consequently, in addition to political/regulatory risk, currency risk is included. In efficient open markets, and to the extent that transaction costs are very small, the yield on the foreign asset hedged in the forward market should be in line with the domestic rate. This too is a measure of political risk, including the currency dimension. The interest parity condition is:

$$f/s - (1 + r)/(1 + r^*) = 0,$$

where: f is the forward rate, s the spot rate, r the domestic rate and r* is the

[4] Regulation Q was removed by the Deregulation and Monetary Control Act, 1980.

Figure 6.1: Closed Interest Parity 3-Month Euromarkets

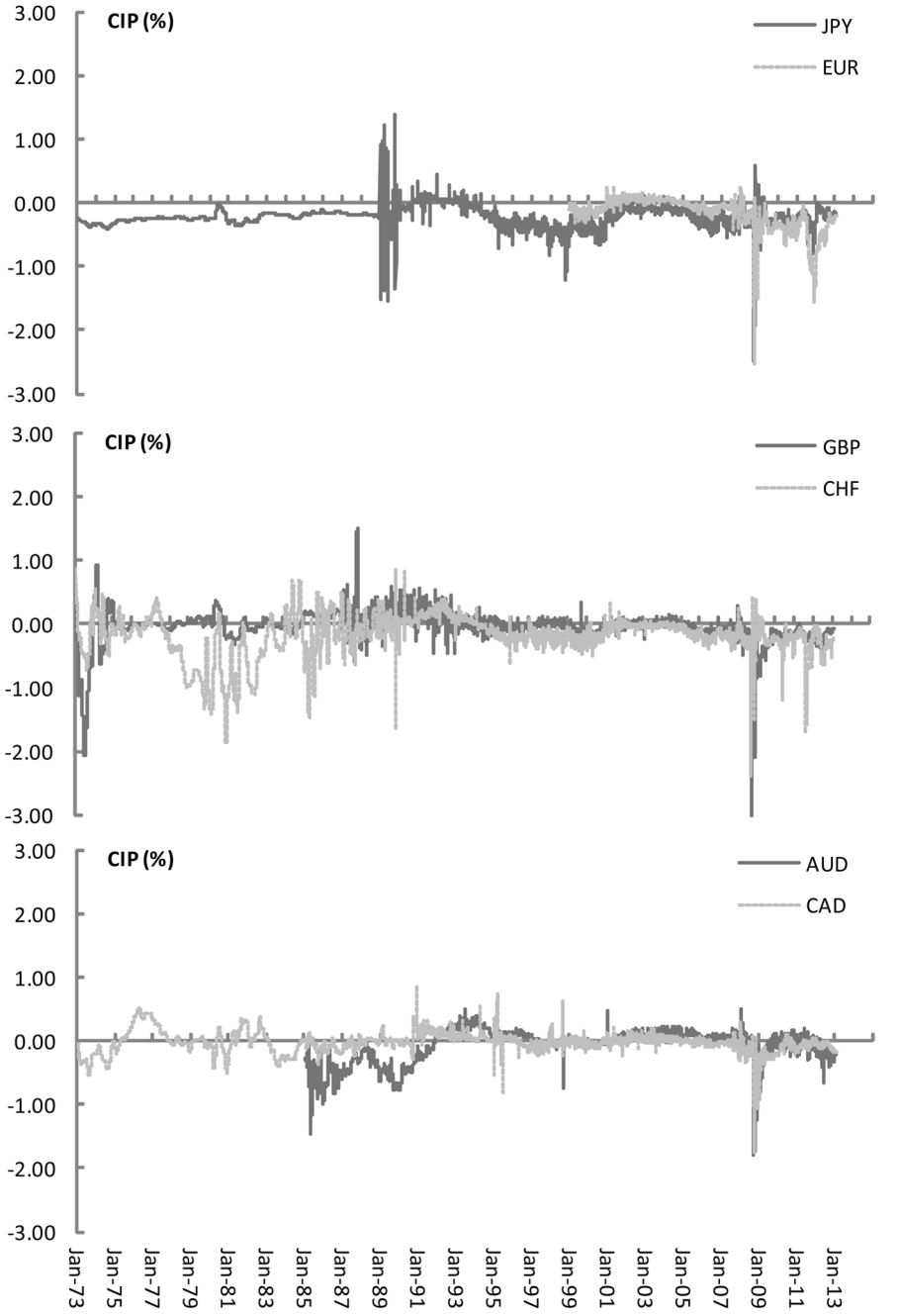


Source: Datastream, Bloomberg, OECD

foreign (dollar) rate. In Figure 6.2 this is shown as the forward premium (domestic currency per unit of foreign currency) less the interest differential in favour of the domestic currency.

A negative number indicates that the interest differential due to political risk (intervention, restrictions on the forward market, exchange controls, etc.) exceeds the forward premium. During the 1970s and 1980s there were consider-

Figure 6.2: Covered Interest Parity, Major Currencies versus the US Dollar



Source: Datastream, Bloomberg, OECD.

able deviations from covered parity. By and large, the covered parity calculations also reflect the moves towards greater openness in the 1990s and the first half of the 2000s: covered parity moves towards zero for the euro, sterling, and the Canadian and Australian dollars. Japan stands out as persistently negative in this later period, and mostly larger in magnitude than these other currencies (reflecting perhaps intervention risk at this time).

6.2.4. The Savings Investment Correlation

The above interest parity indicators of integration relate to financial markets. An intuitively more appealing measure that considers financial and goods market openness is the correlation between national saving and investment. Chapter 2 of this volume focuses on global and European macroeconomic imbalances in more detail – this section focuses on these issues insofar as goods market and capital markets interact and shed light on the capital market openness issue. Feldstein and Horioka (1980) interpret the high correlation between these variables in the 1970s and 1980s to imply that global savings are not sufficiently mobile to fund ex-ante demand for investment goods – or, alternatively, to absorb excess national savings. Numerous subsequent articles have mostly corroborated the findings and offered alternative explanations[5]. For example, some argue that real productivity and terms of trade shocks, or a fall in the rate of time preference that acts to lift saving, may result in a high saving-investment (S-I) correlation in the presence of a non-traded goods sector[6]. If the non-traded goods sector is labour-intensive, a rise in productivity would release factors of production, and proportionately more labour would be allocated to the traded-goods sector. This would result in a higher marginal product of capital in the traded-sector, thereby raising the desired capital stock, resulting in the co-movement of savings and investment. These and other arguments may have some application in developing countries, where interest parity does not hold, but this should not be the case for most OECD countries[7].

Within the borders of countries free trade does apply and capital can be assumed to be perfectly mobile so that the S-I correlation should be zero. Helliwell (1998), using regional data, shows there is little correlation between savings and investment in the Canadian provinces, just as theory would predict, regardless of the presence of traded and non-traded goods. This latter finding is quite

[5] The correlation itself is not due to econometric anomalies, such as the treatment of the endogeneity via instrumental variables. Feldstein and Bacchetta (1991) respond to criticisms of an econometric nature, such as omitted variables (e.g. Obstfeld (1986), economic growth), and dynamic effects such as Summers and Carroll (1987) that governments adjust their budgets to "fill in" for private investment savings gaps rather that see capital inflows or outflows.

[6] (Murphy (1986) and Engel and Kletzer (1989), Wong (1990)).

[7] Obstfeld and Rogoff (2001) show that in a world with transport and transactions costs, combined with intertemporal consumption smoothing, the S-I correlation can be positive.

interesting, and implies that the freeing up of international trade and capital flows should also see something similar occurring in countries and regional groupings, particularly where closed and covered parity holds. Of course, what is true about individual countries and groupings of countries cannot be true of the full global economy. Were it possible to have high quality data for all countries in the world, then savings and investment must be co-integrated. It is not possible for the whole world to violate the budget constraint that savings equals investment. It is well known however that individual countries or sub-groupings of countries can violate the budget constraints over very long periods of time. Countries may choose inter-temporally to allow foreign debt to rise as a share of GDP if future growth is perceived strong enough to warrant it, and vice versa. Furthermore, the S-I relationship may vary with the domestic growth and inflation cycles versus the international cost of capital. Countries which open up to foreign private participation in domestic investment opportunities for technology transfer, synergies in the global supply chain, or resources development reasons will see S-I correlations decline over time as this opening up occurs. Countries that are not open, or which are excessively selective in their openness, should see higher more stable S-I correlations.

To explore this proposition, revised and internationally consistent quarterly data for a constant sample of 23 OECD countries'[8] savings and investment from 1960 are compiled. Panel regressions are run for the OECD as a group, for Europe (including the United Kingdom and Switzerland) and for the periphery (Spain, Italy, Ireland, Portugal and Greece). To explore the changing degree of openness, the following empirical model is specified in equation (1), where the subscripts i and t denote the country and the period, respectively:

$$GFCF_{i,t} = \alpha_{i,t} + \beta * SAV_{i,t} + \varepsilon_{i,t} \tag{6.1}$$

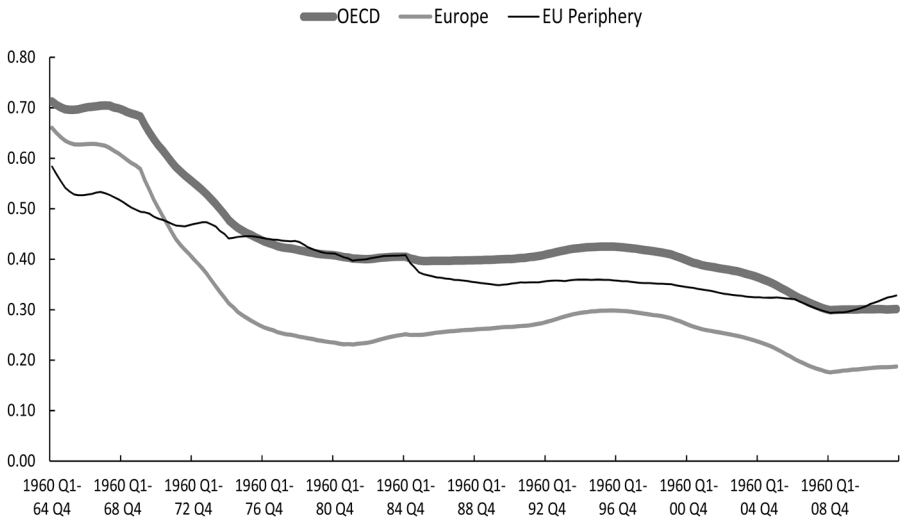
where $GFCF_{i,t}$ is national gross capital formation and $SAV_{i,t}$ is national gross saving. Both variables are expressed in per cent of national gross domestic product. β corresponds to the coefficient of openness. This equation is estimated using ordinary least squares (OLS). From 1960, the panel regressions are run alternately in extending and rolling sample period formats.

Figure 6.3 shows the S-I correlation as an extending sample: each point is the recalculation of the coefficient that arises by adding another quarter of observations for the respective group. This is a fairly straightforward exercise, but the use of OECD data reflecting revised national accounts methodology may alter earlier findings in the literature. The overall trend in the correlation is down, with the

[8] The countries included in this study are: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States.

opening up of trade and capital accounts of the 1960s, 1970s and early 1980s, which were quite momentous events. There is some evidence of a pause from the early 1980s to the early 2000s, followed by a further downward move. The Feldstein-Bacchetta (1991) results, which show little decline in the correlation, are not reproduced in Figure 6.3, suggesting some differences with the data used by those authors and/or because of subsequent data revisions[9]. This of course makes eminent sense, given the above outline of the sequence of trade and capital account reforms in the OECD generally and in Europe in particular (the countries of which dominate the OECD at this time). The great macro 'puzzle' was at least to some extent related to the quality of the data[10].

Figure 6.3: Saving Investment Correlation, OECD Groups, Extending Window



Source: OECD.

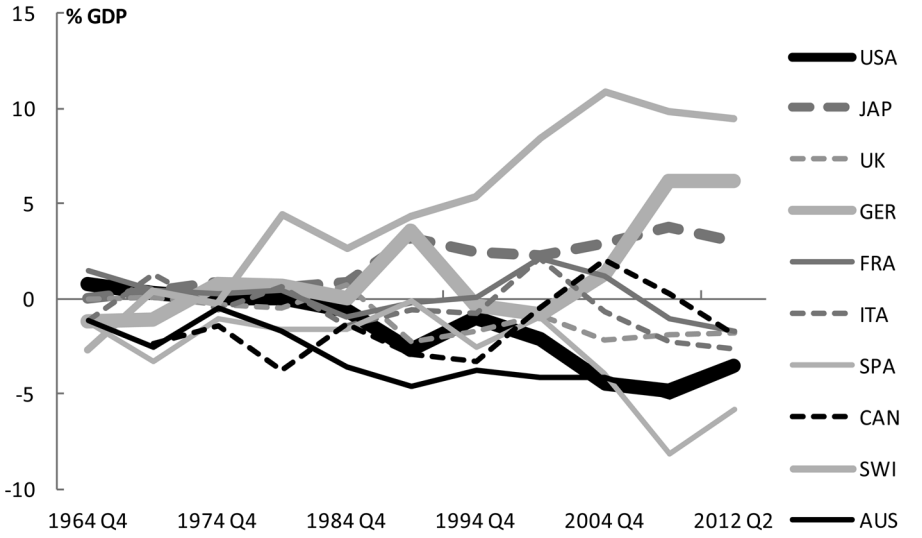
Figure 6.4 shows the 5-year rolling averages of current accounts as a share of GDP for major OECD countries: they bunch around zero until the mid-1970s, and then move in a sharply widening pattern as the oil price shock hits, currencies float and the related deregulation trends begin to take effect. Logically, Europe, which was heavily dependent on oil and led the opening-up process, has lower S-I correlation coefficients in Figure 6.3 than those for the whole OECD: these cor-

[9] The coefficients reported in that study for the dates 1960 to 1969, 1973 and 1986 can be identified in Figure 6.3: they are lower overall and unlike the earlier study they do drift down as the mid 1980s is approached. There have been major revisions to international accounting standards and GDP methodology. The years when complete revisions were implemented (mostly in the 2000s) can be found in: OECD (2012), p. 203. The OECD data used here are fully revised and entirely consistent.

[10] See Obstfeld and Rogoff (2001).

relations move down more quickly, while the periphery countries are flatter and closer to the full OECD coefficients.

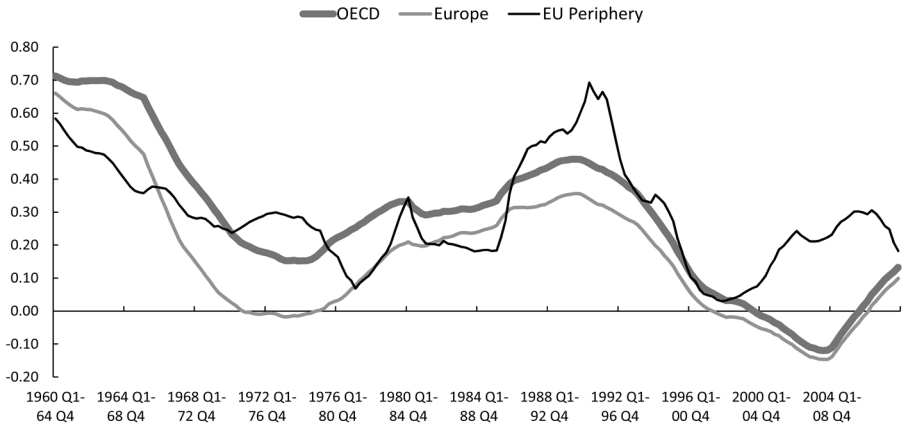
Figure 6.4: 5-Year Average Current Accounts in Key OECD Countries



Source: OECD

Figure 6.5 shows the results of panel S-I correlation regressions for a 5-year rolling window: each time a new quarter is added the quarter from 5 years before is removed.

Figure 6.5: Saving Investment Correlation, OECD Groups, 5 year Rolling Window



Source: OECD.

This rolling window approach provides a focus on the cycle in the openness coefficient β, allowing it to be discussed more easily with reference to historical events.

- The early leadership of Europe in opening trade is reflected clearly in the early sharp declines in the coefficient.
- While the longer-term trend is downwards, there is a tendency for the S-I correlation to rise in crises, such as the major recessions of the early 1980s, the early 1990s and the more recent global crisis.
- The French experiment in the mid 1980s, and the major structural shift in the run up to the single market program in the mid-to-late 1980s appear to have been associated with the some 'stickiness' of S-I correlation.
- The rise in financial interdependence (discussed below) and the completing of the euro project see a sharp drop in the rolling coefficient in the 2000s, until the crisis leads to a reversal.
- This reversal is earlier and more marked in the OECD periphery countries, which have been at the centre of problems within Europe, and hence a greater reluctance for private capital flows to fund external imbalances of the periphery.

6.2.5. The Emerging Economies

Some emerging market countries also embarked on attempts to open markets in the 1980s and 1990s, but progress was limited as periodic crises emerged. Many countries were largely 'autarchic' at this time, other than for the fairly common feature of relying on exports from a narrow commodity base: Mexico was dependent on oil; Chile was dominated by copper exports; and others too were dependent on oil, coffee, and other commodities. Such countries often worked on an 'import substitution model' of development, to diversify away from commodities and this was not conducive to the opening up of their markets.

The collapse in commodity prices from during the early 1980s led to the first emerging markets crisis, and in 1982 Mexico defaulted on its debt. Mexico had used expansionary fiscal policies funded via oil revenue and borrowing (ironically encouraged by the IMF) on international markets – the 1973 oil price rise allowed it to borrow in order to diversify into petrochemicals, other basic industries and to build up a transportation system. Mexico raised tariffs to encourage import substitution in this process. However, the Volcker squeeze from 1979 to fight inflation saw interest rates and the US dollar (from late1980) rise sharply, and prices of oil and other commodities fell soon afterwards. Dollar denominated debtors' positions soon became unsustainable. For the best part of a decade a general Latin American debt crisis was the result. This effectively removed the incentive to open trade and capital accounts. The flow of capital to emerging

markets essentially ceased for the rest of the decade, foreign direct investment (FDI) declined sharply, and a severe recession was followed by poor macroeconomic performance (see Figure 6.8 below). Governments and the IMF dealt with the crisis by trying to ensure debtor countries were able to continue to service their debts rather than forgiving that debt.

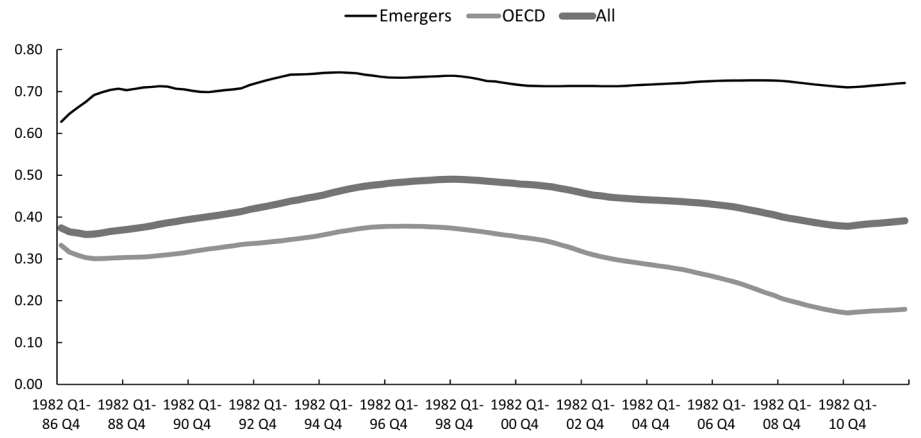
Asia, which was more export-oriented and had a more diversified industrial base than Latin America, did somewhat better, particularly in the 1990s. Net private capital portfolio flows to emerging markets soared at this time, despite the second Mexico crisis in 1994-95, and FDI managed to stabilise and then recover. The huge Mexican current account deficit with a fixed exchange rate was financed by issuing Tesobonos, denominated in pesos but indexed to dollars. As borrowing risks rose, securities were sold by international investors, dollar foreign exchange reserves ran out and the exchange rate in the end collapsed. The US (with Robert Rubin of Goldman Sachs as Treasury Secretary) and the IMF mobilised enough funds to bail out the US banks and other creditors entirely[11]. Rubin used the Treasury's Exchange Stabilisation Fund, so that President Clinton did not have to obtain Congressional approval. The US Treasury/IMF was becoming a vehicle to bail out Wall Street to an even greater extent than in the 1980s, essentially guaranteeing banks, which contributed to reinforcing a too-big-to-fail problem (TBTF) perception which would come back to haunt policy in 2008, in both the USA and Europe, with even greater needs to support financial institutions.

FDI inflows imparted resilience to net capital flows to emerging economies, despite volatility in portfolio and other 'hot' money flows. Globalisation began to take hold in this period, and the market-integrated model of the OECD had seemingly won the argument about successful economic models[12]. At this time there was much discussion at World Bank and other global fora about stabilization and liberalization programs, the need for realistic exchange rates, and the benefits of participation in the open trading system[13]. Centrally planned economies suffering from stagnation in the 1980s also began to move towards the OECD model, trying to participate in the more integrated international economy even before the fall of the Berlin Wall. After the Soviet Union was abolished in 1991, many of the ex-Soviet satellites wanted to detach from Russia and join the EU. During the late 1970s the centrally planned development approach in China was reversed, with Deng Xiaoping as paramount leader from 1978-to 1992 establishing free economic zones, dismantling collective farms and wooing foreign capital.

[11] The bonds had been underwritten and distributed by Goldman Sachs and Citigroup.
[12] The import substitution approach had essentially failed.
[13] Much of the discussion originated with a focus on the experience of the "Southern Cone' of Latin America and took place in the context of the contrasting success of the Asian Tigers. See for example World Bank (1984). The ideas generated were given broad applicability, for example, J. de Melo and S. Dhar (1992). A synthesis of these ideas gradually came to be known as the "Washington Consensus". See, notably, J. Williamson (2004).

Consistent data are not available for the emerging economies considered here (China, India, Brazil, Mexico, South Africa, and South Korea[14]) back to 1960, so the S-I correlation indicator begins only from 1982. Despite some modest efforts at opening up, both the structure of trade and the maintenance of significant capital controls appear to be consistent with a much higher S-I correlation than found for the OECD, as shown in Figure 6.6, and there is no sign of it declining over time. This suggests a very wide disparity of openness between the OECD and emerging countries in terms of willingness to open trade and to remove capital controls.

Figure 6.6: Saving Investment Correlation, Emergers/OECD, Extending Sample

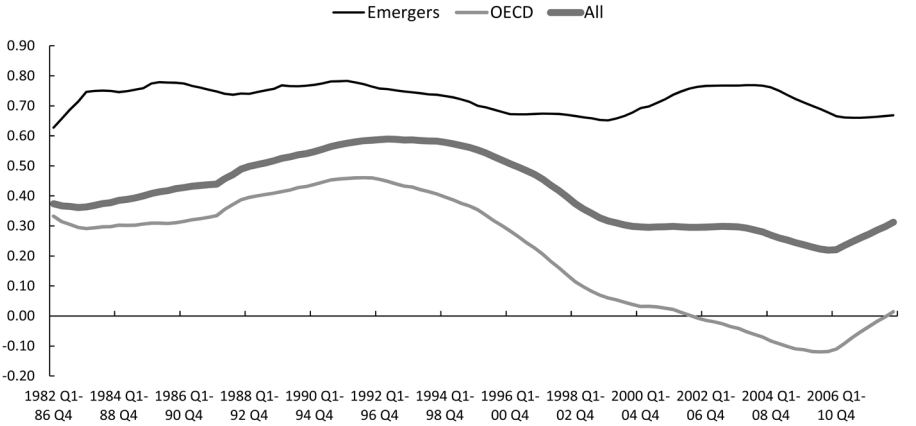


Source: OECD.

Figure 6.7 shows the results for the 5-year rolling window S-I correlation. The OECD results reflect those shown earlier: a sharp decline in the 2000s. The emerging countries show evidence of some decline in the correlation during the 1990s. The coefficient for the 5-year period to 1994Q4 was around 0.78 and it subsequently fell to 0.65 for the 5-year period to 2001Q4 encompassing the Asia crisis. This is followed by a reversal back to pre-crisis coefficients before edging down again more recently.

[14] South Korea and Mexico are included here as they joined the OECD only in the 1990s, and the focus of this paper is historical.

Figure 6.7: Saving Investment Correlation, Emergers/OECD, Rolling Window



Source: OECD.

6.2.6. Asia Crisis

Emerging Asian countries had pegged to the dollar and industrialised rapidly financed by net private foreign borrowing, and in the first half of the 1990s they built up huge foreign debts[15]. A lot of the finance went into companies characterised as 'crony capitalism', where related party transactions and poor corporate governance were a common feature. Assets became overvalued as the weak dollar environment led to foreign exchange intervention and monetary accommodation. The policy of fixing against the dollar, while trade competition was increasingly versus Japan, had worked well during the Japanese bubble (after 1985) while the dollar was weak. However, the US tightening cycle that began in January 1994 eventually saw a reversal of the dollar. Thus, when the yen peaked in1995 and fell back, non-Japan Asia experienced increasing competitive pressure, exposing them to withdrawal of funds by hedge funds and portfolio managers. Thailand (and others) had let 'hot money' in, and when these flows reversed, vicious circle mechanisms set in (falling asset prices, reserves loss, contraction)[16]. The IMF organised a series of bail outs tying packages to reform and structural adjustment packages (cuts in fiscal policy; higher interest rates to protect the exchange rate; allowing insolvent financial institutions to fail; developing western style bank models; and reducing restrictions on foreign ownership).

[15] Many have used the Asia crisis as an excuse justifying capital controls. See, for example, Stiglitz, J. & Yusuf, S. (2001), and articles therein. The real problem is managing the exchange rate, and monetary policy accommodating speculation as a result of exchange market intervention. Australia is in Asia, has followed sensible economic policies, including free capital flows and floating since 1983. It suffered no crisis in 1997. Others have rightly argued for the need to restructure the global financial architecture comprised of OECD liberalised economies and those which control capital flows. See Eichengreen, B. (1999). But how to do this remains elusive.

[16] See Corsetti, G., P. Pesenti & N. Roubini, (1998).

The policy of allowing insolvent institutions to fail in Asia was in sharp contrast to the way US and European banks were treated in the peso crisis and in the more recent global turmoil. Similarly, the recession that followed higher rates and fiscal cuts in Asia was in contrast to the vigorous easing of monetary policy and relaxation of bank rules that the US and Europe imposed following the 2001 recession and tech bust and the recent crisis. Many Asian borrowers couldn't pay their debts as the economy went into recession. Subsequently, Asia veered away from the IMF model and capital controls have remained a strong feature[17]. FDI flows have been relatively modest as a consequence, in spite of impressive growth.

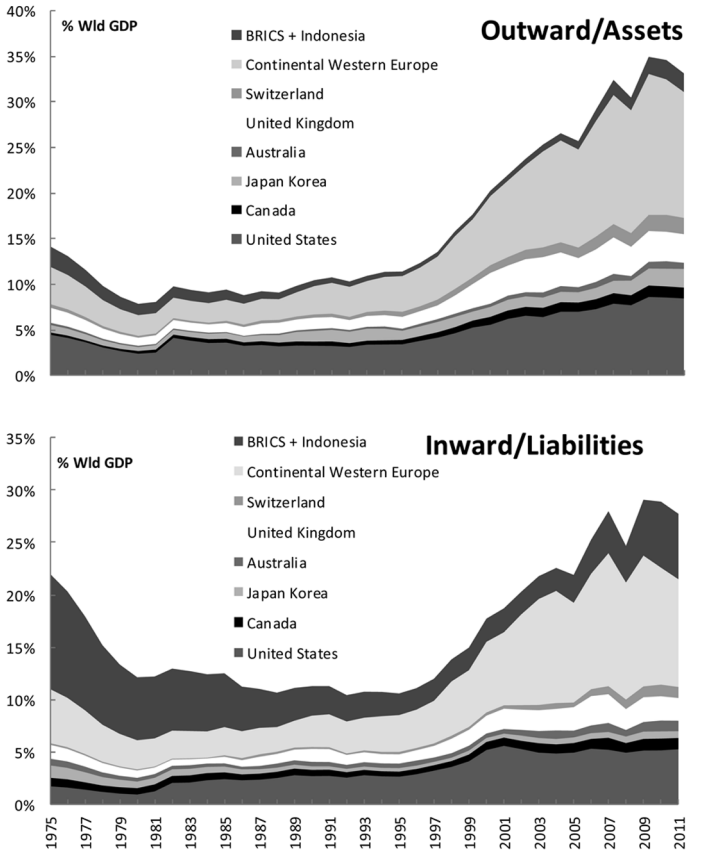
6.2.7. Foreign Direct Investment

Continental Western Europe and the United Kingdom also appear to have led the world in opening up with respect to FDI. Figure 6.8 shows FDI outward (assets) levels for the OECD areas and the emerging group in the top panel, and the FDI inward (liabilities) in the bottom panel[18]. Following the first oil crisis and the turmoil that led to the floating of exchange rates, OECD openness appeared to moving backwards until the early 1980s. At this time, the deregulation and opening up of capital accounts in the OECD countries is reflected in a rise in the levels of both inward and outward FDI, with latter outpacing the former somewhat. In 1981 the inwards and outwards levels are both around 6% of the combined OECD/BRICS GDP. Subsequently, inward FDI stocks of liabilities rise to around 20% of GDP by 2011 (of which the United Kingdom and Continental Western Europe comprise 12.5%). Outward FDI stocks of assets rise to 30% of GDP in that year (of which the United Kingdom and Europe comprise around 18%). These FDI patterns for the OECD are very consistent with the S-I correlations and the interest parity findings reported earlier. However, this globalisation phenomenon has been associated with a falling share of the OECD in the combined OECD/Emerging GDP. In 1975 the 23 OECD countries were 90% of the combined OECD/BRICS GDP, and this fell to 75% by 2011, with most of the decline occurring in the 2000s financial integration and (eventual) crisis period.

The Emerging group (BRICS plus Indonesia) is also consistent with the earlier S-I correlation finding of the relative absence of openness, particularly with respect to outward FDI. Prior to 2004 the levels of assets and liabilities were small. From 2004 inward FDI rose from 2% of the combined OECD/BRICS GDP to 6% by 2011. Outward FDI levels have been even less impressive: a little over 0.8% of the combined OECD/BRICS GDP in 2004, rising to a mere 2% by 2011.

[17] See Radelet, S. and J. Sachs, (1998).
[18] OECD data for all of the BRICS plus Indonesia is only available from 2004.

Figure 6.8: Foreign Direct Investment



Source: OECD.

6.2.8. Developing Countries and Distortions Caused by Capital Controls

Most countries in Asia ex-Japan and many Latin American countries have maintained heavily managed exchange rates and engage in financial repression to support them. These include controls on capital inflows: to manipulate exchange rates; to help monetary policy autonomy when exchange rates are managed; for prudential stability reasons, such as avoiding asset and liability mismatches in foreign currency exposures and maturities; and for sovereign security and national interest reasons (including industry protection and the control of economic rent in resource extraction industries). Such controls include inter alia:

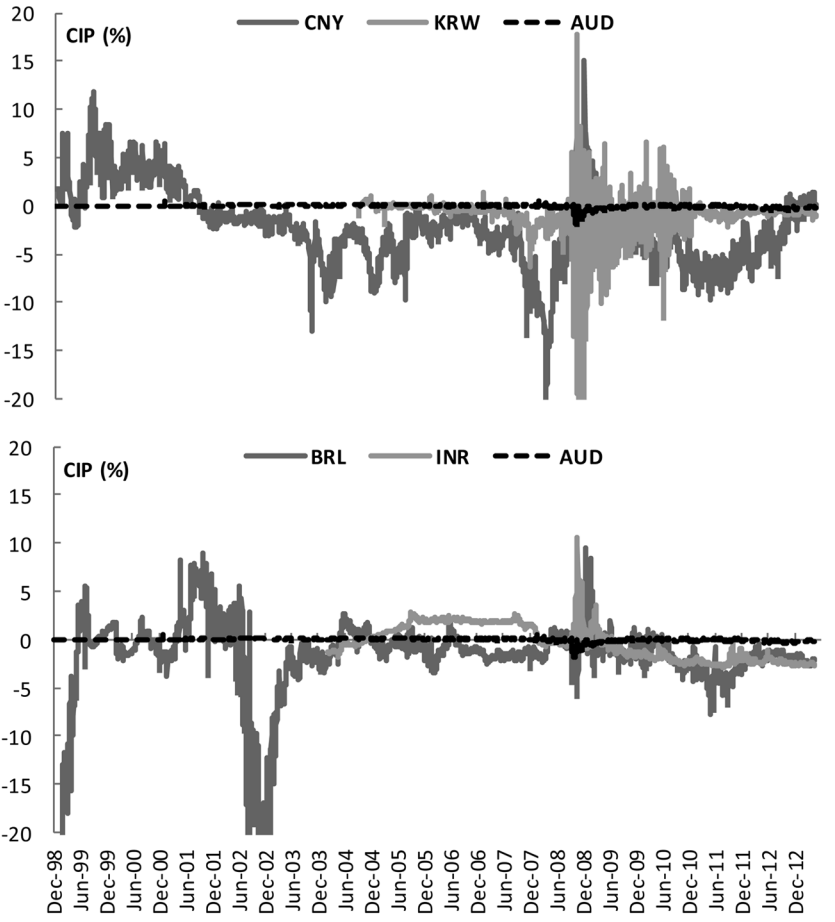
– price based controls: taxing capital inflows and required reserves on capital inflows;

– quantity based controls: quantitative limits on foreign ownership of domestic companies; reporting requirements and limits on foreign exchange borrowing abroad; limits on the ability to borrow offshore; licensing procedure for foreign firms, limits on open forward market derivative positions, etc.

Controls on outflows are usually imposed with the aim of: attempts to manage the exchange rate while maintaining monetary policy autonomy; protecting the tax base; preserving savings to fund domestic investment; and allocating credit to help domestic industry.

Such controls include, inter alia: multiple exchange rates; exchange controls; restrictions on the purchase of foreign assets and deposits; and limits on currency convertibility.

Figure 6.9: Covered Interest Parity in Asia: China, Korea vs Australia



Source: Bloomberg, OECD.

Figure 6.9 shows the covered interest parity condition for China, Korea, India and Brazil. Clearly covered parity does not hold in these countries, and similar results are found for others that use combinations of some of the above capital control procedures in Asia and Latin America. Australia is added for comparison to a country in the region that does not maintain capital controls and does not intervene in the foreign exchange market. When the local currency is not deliverable in the forward market (essentially banned in the case of China, and severely limited to 40% of domestic bank capital and 150% of foreign bank capital in the case of Korea), then an offshore Non-Deliverable Forward (NDF) market develops that allows shadow hedging deliverable in dollars. Similar NDF markets have developed for India, Chinese Taipei, Indonesia and others[19].

These policies to manage exchange rates at undervalued levels directly impact other countries. They result in beggar-my-neighbour trade outcomes and imbalances, which always risk retaliation and destruction of the gains from trade. They also force unpalatable choices in macro policy on to other countries. China has a large saving pool, maintains an undervalued exchange rate, and redistributes reserves to the world to fund its current account surplus in the face of capital inflows. This distorts trade through the relative price effect and can be offset only by contracting absorption through domestic demand in major trading partner countries (such as the United States). But while import competition resulting from the huge global supply shock from the developing world runs on and this, together with the fear of job losses in trading partners, keeps inflation low, monetary and fiscal authorities prefer to maintain expansionary policy for domestic growth and inflation rather than demand contraction to offset the impact of misaligned exchange rates on external imbalances. This in the end leads to distortions in assets price cycles, financial stability and ultimately longer-term for inflation pressures.

The poor relative growth performance of OECD countries, culminating in the global financial crisis from 2007 to the present, raises important questions – did the OECD go too far in opening up their economies or financial systems, creating too much interdependence and complexity? Alternatively, is there an issue of the incompatibility of free market systems alongside economically significant 'state capitalist' regions, which trade with and invest in each other?

6.2.9. The Crisis and OECD Countries

Covered interest parity holds (other than for transactions costs in the 0-0.5% range) in most of the large trading currency countries within the OECD. However, during 2008, as the crisis reached its worst point, there were some sharp

[19] See Chapter 2 of this volume for a discussion of China's external balance and exchange rate policy.

deviations in covered parity to the 1-2% range. This was in large part due to the very real risk that some major financial institutions involved in the derivatives market might fail. Counterparty risk became extreme. But even in the midst of this crisis, the foreign exchange market performed well, and deviations from interest parity never approached the magnitudes of countries that maintain controls on capital inflows and outflows. Counterparty risk has however greatly increased interdependence in the world financial system, with implications for financial fragility and (because of deleveraging) the real economy. Whereas opening up markets and increased integration in trade and capital flows carries with it positive welfare implications, greater interdependence in the financial system should not necessarily be thought of in the same way.

6.2.10. The Risk of Rebuff to Global Integration

The global crisis has seen some signs of a backward shift in openness. There has been little measurable sign of increased openness in emerging markets, and as the crisis unfolded, there have been signs of backward moves in some OECD countries. It is true that capital flows have dried up in part for temporary reasons, such as the market concerns over financial institution insolvency leading to a drying up of short-term cross-border lending. Some of this has been the result too of a home bias pursued by regulators in ring-fencing their own banks' capital adequacy[20]. Others, such as Korea, have introduced new measures that control capital flows and essentially target exchange rates by limiting the functioning of the forward market and other related measures – such moves are explained as domestic prudential measures, but move countries using them closer to the way other emerging markets have always behaved[21].

It is difficult to say whether this is likely to be permanent. Part of the problem has been caused by the response to the crisis: i.e. very low interest rates and unconventional polices such as quantitative easing. Aside from helping relieve banks with balance sheet losses through better spreads (for improved operating earnings) and asset re-inflation, such measures also affect the exchange rate. This may be a legitimate market-price-based response of OECD countries to beggar-thy-neighbour exchange rate policies in the developing world. Japan's proposed quantitative easing on a large scale, following those of the US Fed, the ECB and the Bank of England certainly helped to lower the yen at times in the first half of 2013. Even Australia is being forced into easier policies as a consequence of the high value of its currency.

[20] See ECB (2012) and (2013).

[21] Such moves have been described as a prudential measure to reduce the risk of foreign currency exposure of banks given the hedging activities of local businesses etc. However, were this the case, as opposed to an exchange rate targeting exercise, a domestic capital buffer could be required for banks related to such exposure, rather than discriminating between on-shore and offshore implied interest rates.

A major risk at this point in time is that more countries resort to capital controls and exchange rate policies in response to quantitative easing in a world where openness and integration is perceived to have benefits more limited than hitherto. Such backsliding towards reduced openness could become damaging to global trade and economic development more generally.

6.3. FINANCIAL INTEGRATION AND INTERDEPENDENCE TRENDS

Financial market deregulation proceeded in parallel with the opening of trade and capital markets, and this has led to a greater integration of banking activities across countries. To the extent that this mirrors the opening of markets and the facilitation of capital flows there are undoubtedly benefits from this. However, this process also increased the complexity and interdependence of the financial system: reducing the effectiveness of regulation in controlling leverage and new financial products, both of which became key hallmarks of the global financial crisis. This form of global integration requires more careful assessment of the benefits of increased trade in financial services versus the raised vulnerability of the financial system to counterparty and other interdependence risks.

6.3.1. Growth of Cross-Border Banking

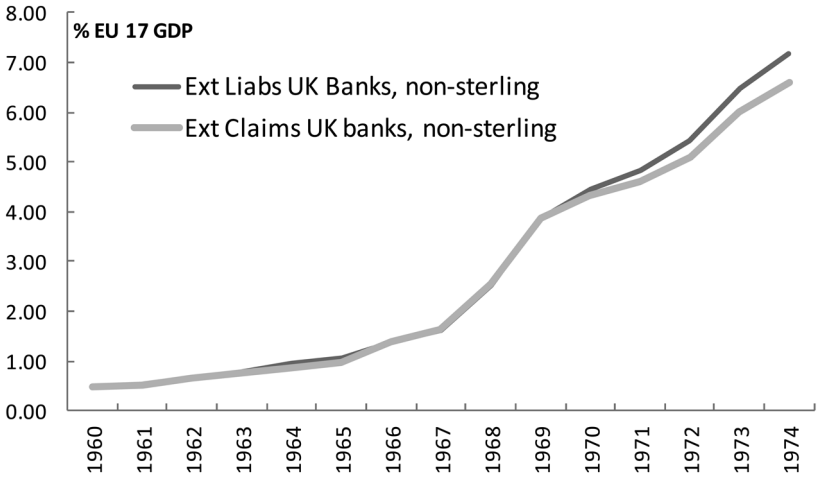
In the 1960s and 1970s banking integration centred on the development of the Eurodollar market, which was located primarily in the city of London. Figure 6.10 shows the non-sterling assets and liabilities of UK banks from 1960 to the mid 1970s, as a percentage of GDP in the 17 western European countries: both rose from virtually nothing to 6.5% and 7% of EU GDP, respectively, by 1975.

The creation of the European Monetary Union (EMU) with its managed exchange rates and the subsequent the launching of the euro were both a continuation of the single market process that had begun in 1992[22]. Based on BIS data with comprehensive coverage across countries, available from the late 1970s, European banks' cross-border businesses continued to expand rapidly, as shown in Figure 6.11. The external assets of western European banks by residence rose from around 20% of western European GDP in 1977, to peak at around 133% in 2007, on the eve of the crisis. Some part of this contributed to financing corporate long-term investment in Europe and 'catch-up' growth in Central and Eastern Europe (CEE). Subsequently, the financial crisis has led to deleveraging generally, but with a much greater impact on banks' foreign assets.

[22] See Chapter 1 of this volume on global and European monetary arrangements.

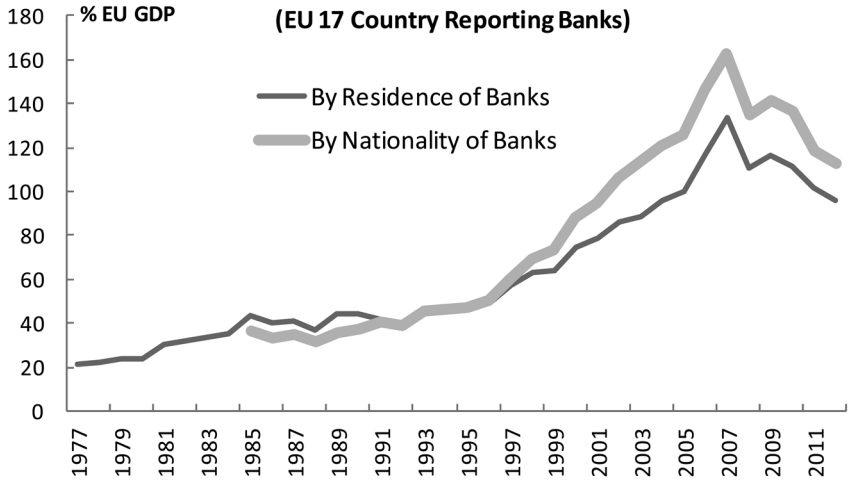
The external assets of western European banks had fallen back to 97% of GDP by 2012. The ratio of foreign assets to GDP of banks by their nationality (as opposed to residence) was noticeably stronger prior to the crisis, peaking at 162% in 2007, and subsequently falling back to 114% after the crisis. The difference between foreign assets by nationality and residence of some 30% of GDP in 2007 illustrates the extent to which banks have opened subsidiaries and branches outside of their own borders.

Figure 6.10: External non-sterling Assets & Liabilities of UK Banks



Source: OECD. BEQB Statistical Abstracts No. 2 (1970) and (1975).

Figure 6.11: External Assets of EU Banks by Nationality vs Residence



Source: BIS, OECD.

A substantial part of this expansion of banking within Europe was into CEE countries, anticipating their growth and the possibility of their later integration into the EU. Financial integration, however, has proceeded more quickly than that for the real economy, where structural aspects including fiscal policy and labour market flexibility have not converged. The narrowing of nationality and residence gap to 17% of GDP in 2012 illustrates the extent to which bank deleveraging has focused on pulling back from foreign subsidiaries and branches – and this has affected negatively the CEE economies' ability to weather the crisis.

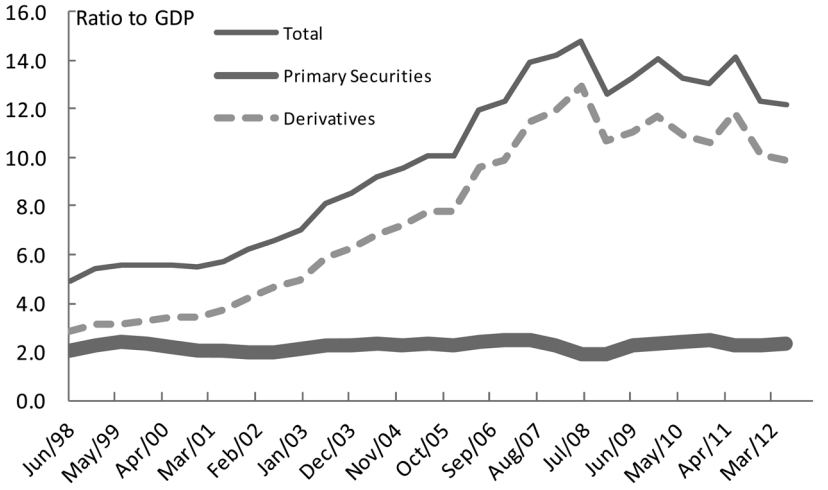
6.3.2. Growth of Bank Interdependence

Financial deregulation in the 1990s and 2000s occurred at a time of financial innovation and the proliferation in the use of derivatives, particularly interest rate swaps (IRS) and credit default swaps (CDS). Figure 6.12 shows primary securities in the world financial system and the notional value of all global derivatives. Primary securities consist of: bank balance sheets (other than derivatives); non-bank debt securities issued; and equities. These components are 'primary', in the sense that they finance directly some form on non-bank economic activity. Derivatives, on the other hand, fund nothing: they shift the ownership, structure and the riskiness of primary securities. Yet all derivatives are based on counterparty risk between the buyer and the seller, which operates with collateralisation via initial and variation margins. Initial margin is posted (typically cash) as collateral, and as the prices of the reference primary securities change, the variation margin is settled on a daily basis between the two counterparties. In this sense derivatives, which fund nothing, nevertheless carry all the bankruptcy characteristics of debt. The losing counterparty must be able to post cash from existing assets or borrow it (typically in the repo market). While primary securities have fluctuated within a range of 2 to 3 times world GDP since 1998, the notional value of derivatives rose from around 3-times world GDP to a staggering 12-times world GDP during the decade to the eve of the financial crisis in 2007.

Figure 6.13 shows an index of global bank interdependence labelled "Beta", and the gross market value (GMV) of derivatives in billions of dollars[23]. The GMV of derivatives is much smaller than the notional exposure (on which bank fees and spreads are based): whereas in 2007 the notional value rose to some USD 700 trillion, their GMV rose suddenly from USD 10 trillion to around USD 37 trillion as the crisis hit. The GMV of derivatives is the amount that would have to be settled at the prices prevailing at that point in time. Settlement may occur via the

[23] The series is led one year so that the beta calculated on daily data over the year to the date shown, corresponds to the derivatives at the start of that beta calculation.

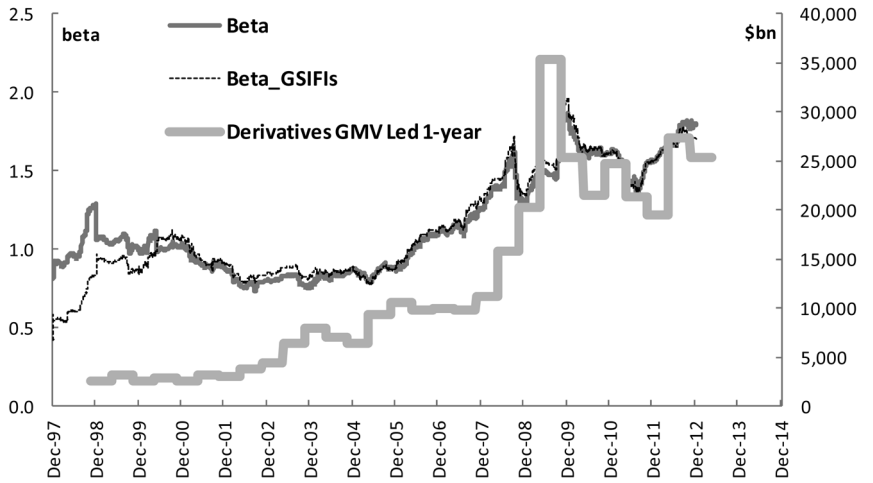
Figure 6.12: Global Primary Securities versus Derivatives (Notional)



Source: BIS, OECD, World Federation of Stock Exchanges.

netting of any positive and negative derivative positions (where this is contractually permitted or in a close out situation) and via the margin collateralisation process. The sudden rise in the GMV as the crisis hit revealed a huge shortage of capital and eligible collateral in the world financial system.

Figure 6.13: Global Bank Derivatives (GMV) & Interconnectedness



Source: BIS, Bloomberg, OECD.

The global bank Beta is a measure of interdependence. It takes the daily stock prices of 70 global banks with more than USD 50 billion in assets, including all

the GSIFI banks, and calculates for each a one-year rolling beta (correlation) to the MSCI world stock market index. Each banks individual beta to the MSCI is then aggregated according to the (rolling) asset weight of the bank in the total assets of all the banks[24]. During the Asia crisis of 1997-98 the beta correlation rose from around 0.75 to above 1.0, spiking at 1.3 in 1998. The GMV of derivatives was only around USD 3 trillion at that time. Subsequently, the beta fell back to where it was before the Asia crisis. However, from around 2005, the interdependence of global banking began to rise in an unprecedented way, to a global weighted-Beta peak of around 1.8 during the Lehman crisis. It fell back temporarily to 1.3 (bottoming well above 1) and then the global bank beta rose again in the second phase of the crisis to a record level of 2 in 2009, just before the first quantitative easing by the Federal Reserve in the USA began – it has subsequently varied within a range of 1.3 to 1.5. This ratcheting up of bank interdependence has been associated with the rise of counterparty risk, shown in Figure 6.13 by moves in the GMV of derivatives: i.e. because of the growth of counterparty risk undertaken by the GSIFI banks which dominate this business.

There are many socially useful roles for derivatives, particularly where these concern end users, such as airlines hedging fuel costs, exporters hedging their exchange rate risk, insurance companies hedging the interest rate risk in annuities, and so forth. However, the rapid growth in some instruments such as interest rate swaps and CDS were also used for purposes that might be considered less than socially useful:

– the considerable energy and use of resources by GSIFI banks to shift risks with a view to avoiding regulatory capital charges; and
– to structure products for clients by taking advantage of wide differences in taxation regimes between jurisdictions, individuals and financial products.

The interdependence caused by these innovations and products based on derivatives is multiplied between banks globally by a process known as re-hypothecation. When a bank takes cash as collateral in a derivative transaction, the cost can be greatly reduced (profitability increased) if the client signs a re-hypothecation agreement, whereby that cash can be lent (e.g. through the repo market) for new derivative transactions. In this way collateral is re-used a number of times, building more leverage into the financial system and increasing its vulnerability in the event of a shock: the velocity of collateral can be said to have risen.

[24] This concept is different from the capital asset pricing model concept of beta where the risk free rate plays a role.

6.3.3. The Causes of the Ratcheting up of Bank Interdependence

The generic cause of the explosion of new leveraged bank business through derivatives and related products, including the tri-partite repo market, was the interaction of bank product innovations and financial deregulation.

– Banks argued successfully against separation policies that limited their international business models, notably by the Glass-Steagall Act in the USA. Just when European universal banks might have benefitted from the separation of traditional and investment banking, the regulatory and business model trends were in exactly the opposite direction. The main drivers of bank lobbying in this regard were the profitability of leverage and high OTC derivative spreads, as well as the business model need to have sufficient diversity of market views and scale amongst counterparties. Glass-Steagall was removed by the Gramm-Leach-Bliley Act in 1999.
– Banks consistently supported regulations under Basel II "consensus" approach to regulation because it permitted them to keep capital requirements very low (see below). Bank lobbying was extraordinarily successful in bringing about this 'light touch' form for the regulatory regime. The announcement of Basel II in July 2004 (to have been implemented by 2008), and the SEC's removal of leverage controls on investment banks, actually encouraged the rapid growth in leverage and the profitability of banks[25].

Figure 6.14 shows the asset-weighted simple leverage ratio of GSIFI banks and that for the population of 70 global banks (that includes the GSIFI banks) both led one year[26]. The Figure also shows the distance-to-default (DTD) of the 70 banks weighted by their share of assets. The DTD is the market value of assets (based on the Black-Scholes formula) minus the book value of liabilities measured in standard deviations[27]. High numbers of the DTD are associated with a profitable well-capitalised banking system, while zero is the default point.

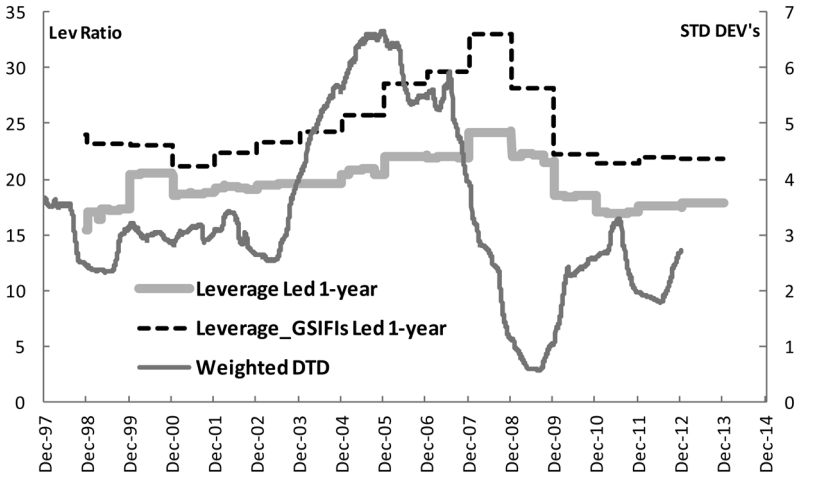
The growth of product innovation and reduced control of leverage saw the weighted GSIFI bank leverage rise from around 21-times capital prior to the removal of Glass-Steagall to 34-times on the eve of the crisis. For the population of 70 banks, leverage rose too, from around 18-times to a peak of 24-times bank capital.

[25] The change in SEC rules in 2004 allowed investment banks to be supervised on a consolidated entities basis, in place of the strict SEC limitations on leverage. This was equivalent to the regulatory minimum that US banks would need to operate in Europe.

[26] The DTD is calculated on daily data over the preceding year, which should be related to leverage at the start of the period.

[27] See Blundell-Wignall and Roulet (2012). This process is often referred to as risk-weight optimisation.

Figure 6.14: Global Bank Distance-to-Default, and Leverage



Source: BIS, Bloomberg, OECD.

Sophisticated banks under Basel II were allowed to model the riskiness of their own portfolios to calculate risk-weighted assets (RWA) to which the capital rules were applied. By reducing the ratio of RWA to total assets banks could minimise the capital required to conduct their activities and hence to expand leverage[28]. Banks carried out this regulatory arbitrage or risk-weight optimisation by:

- biasing portfolio choices to assets carrying less capital requirements;
- valuing assets and their relative riskiness with their own models – no two[29] banks having the same model system – and manipulating the outcomes;
- transforming the riskiness of assets and shifting their ownership with derivatives; and
- securitisation and the creation of special purpose vehicles (SPVs) to move products off their balance sheets.

The Basel rules also permitted banks to use broad concepts of capital to satisfy the numerator of the Tier 1 ratio (including subordinated debt, hybrids, etc), instead of (costly) pure equity, with each jurisdiction seemingly allowing different rules that best suited to the needs of their own banks.

At the same time, confidence to operate at high levels of leverage was fostered by the TBTF phenomenon. Large global banks, as noted earlier, were prime beneficiaries of official funding mobilized by the IMF for Latin America and Asia

[28] The huge problems with the move to Basel II were at the heart of the problem. See Blundell-Wignall and Atkinson (2008), (2011), and (2012); and Blundell-Wignall Atkinson and Roulet (2012), and Blundell-Wignall and Roulet (2012).

[29] See Chapters 7 and 11 of this volume for a discussion of regulatory arbitrage.

during the 1980s and 1990s. The fact that the lender-of-last resort is there to support bank liquidity, and that governments will act to bail out TBTF systemically important banks, gives creditors confidence that they are unlikely to lose any money[30]. This enhances confidence to trade in high-risk activities: essentially facilitating the under-pricing of the risks being taken and raising the volume of business compared to what it would otherwise be.

Rising leverage, confidence that creditors would not lose money, and positive bank spreads, led to a surge in profitability. By 2006-2007, on the eve of the crisis, the weighted average DTD reached an unprecedented level in the range of 5-7 standard deviations above the default point. The aftermath of this unprecedented growth in interdependence was the global financial crisis: the weighted DTD fell towards zero, with many banks actually moving below the default level. Deleveraging on a massive scale has ensued – with deleterious effects of the real economy of most countries. Both of the above measures of leverage have returned towards their pre-crisis levels.

Table 6.1 illustrates just how damaging the role of derivatives was during the crisis. It shows the close-out (netted positions) of the bank counterparties to AIG, which were settled by cash payments from the US government. AIG was an insurance company part of whose business was to write CDS contracts for large GSIFI banks to enable them to transform the riskiness of assets and reduce their capital requirements under the Basel system[31]. More than half of these net amounts were paid to European universal banks. The exposures of banks after netting and not covered by cash collateral to this one single counterparty AIG was as much as 37% of the equity capital of Deutsche Bank, 77% for Merrill Lynch (inherited by Bank of America), 29% for Goldman Sachs, and so on[32].

The problem with interdependence caused by margin call exposures on the scale considered here is that the whole system is exposed: conglomerate banks have too little capital and there is a general shortage of collateral and appropriate rules for its management (including account segregation and re-hypothecation rules)[33]. It is highly likely that the whole financial system would have collapsed had central bank lending and government support not been there. Even after all of regulatory changes in the move to Basel III, increased supervision and bank assurances of better models, Dexia, a large European conglomerate bank, failed as recently as

[30] Losses incurred in the Lehman Brothers' bankruptcy and in Greek debt restructuring may, in time, be seen as important positive steps in encouraging more prudent behavior in global financial markets.

[31] See Government Accounting Office (2009).

[32] These numbers make a mockery of the claim that universal banking is safe, and that derivatives don't need to be separated from traditional banking. Deutsche Bank has claimed it received no official support – but this presumably excludes the injection from the US Treasury.

[33] Goldman Sachs has claimed that they were not at risk to AIG, as they had bought a CDS contract on the possible failure of AIG (The CFO, at the Stanford conference in July 2010). However, only the other GSIFI banks on the list here could have credibly written such protection.

Table 6.1: Payments to AIG Counterparties: 16 Sept. to 31 Dec. 2008

Institution	(billions of US dollars) Collateral postings for credit default swaps	Payments to securities lending counterpaties**	Total	As a share of capital*** at end-2008
Goldman Sachs	8.1	4.8	12.9	29.1%
Societe Generale	11.0	0.9	11.9	28.9%
Deutsche Bank	5.4	6.4	11.9	37.4%
Barclays	1.5	7.0	8.5	20.0%
Merrill Lynch	4.9	1.9	6.8	77.4%
Bank of America	0.7	4.5	5.2	9.1%
UBS	3.3	1.7	5.0	25.2%
BNP Paribas	…	4.9	4.9	8.3%
HSBC	0.2	3.3	3.5	5.3%
[memo: Bank of America after its merger with Merrill Lynch]			12.0	*[18.1%]*

*Direct payments from AIG through end-2008 plus payments by Maiden Lane III, a financing entity established by AIG and the New York Federal Reserve Bank to purchase underlying securities.
**September 18-December 12, 2008.
***Common equity net of goodwill; net of all intangible assets for Merrill Lynch and HSBC.

Source: AIG; US Treasury; Government Accounting Office; OECD

October 2011 due to the failure to meet margin calls of USD 25 billion. When it did so, it still had a Basel Tier 1 ratio of 7.4%, well above the old minimum of 4%.

The OECD, in an econometric panel study of the determinants of the DTD covering 94 global banks, has found that the 4 main factors for the DTD are[34]:

- a strong negative relationship with the simple leverage ratio (but no connection with the Basel Tier 1 ratio);
- a strong negative relationship of the DTD with derivatives – interdependence via counterparty risk;
- a negative relationship with wholesale funding;
- a positive relationship with available for sale trading securities.

It is for these reasons that the OECD has consistently been in the lead of those proposing a simplified rule to control leverage, and to separate traditional banking functions (such as deposit taking and lending) from derivatives and other investment banking functions, where the latter are above some maximum threshold.

6.4. CONCLUDING REMARKS

The global economy has evolved a long way from its post-war fragmentation as the European powers retreated from their empires and Europe split into opposing political blocks based on very different economic and financial systems. The

[34] See Blundell-Wignall and Roulet (2012).

Bretton Woods agreement, the Marshall Plan, successive GATT rounds, the European Coal and Steel Community and the Treaty of Rome set the stage for the progressive, market-oriented, trade and financial integration of western Europe and what evolved as the OECD area during the past 50 years.

This process has been remarkably successful. The OECD area has enjoyed a high degree of widespread prosperity while concerns of the early post-war period that renewed major conflict in Europe was just a matter of time were not borne out. Its market-oriented trade and financial integration has proved to be an attractive force to other parts of the world that had opted for more autarchic development models and central planning. The result has been the process widely known as "globalization" as the OECD area has welcomed the extensive participation of emerging economies in its economic and financial activities, while the European Union has provided a framework for more profound integration of Eastern Europe economies following the collapse of central planning.

The process still has some way to go. At this stage the Asian Tigers (Korea; Chinese Taipei; Singapore; and Hong Kong, China) should be considered as internationally integrated developed economies. But Thailand, Malaysia, Mexico, Turkey and the BRICS are less advanced in this regard. Much of Eastern Europe has joined the EU, but these countries have varying degrees of "catching up" with their western partners in front of them, both in terms of living standards and in terms of institutional development. Notably in regard to the financial issues that have been the focus of this paper, most have yet to join the euro area. Remaining parts of Europe (mainly in former Yugoslavia and Albania) and the former Soviet Union, most of Africa and much of the Islamic world have lagged behind.

A major risk at this point in time is that more countries resort to capital controls and exchange rate policies in response to low interest rates and quantitative easing policies in the West; policies which inevitably affect exchange rates. Openness and integration may be perceived to have benefits more limited than thought hitherto, and trade competitiveness is one of the few degrees of freedom at present. Such backsliding towards reduced openness could become damaging to global trade and economic development more generally.

With regard to financial issues, there remains an outstanding agenda as the world struggles to recover from the recent financial crisis and to ensure that it is not repeated. The global financial system has become too dominated by a small number of excessively leveraged banks, mainly based in the EU and the United States, that are too large and inter-connected to be allowed to fail. There are also too many perverse incentives in the system. Developing these themes would be beyond the scope of this paper[35], but the main priorities can be summarized as follows:

[35] For a more extensive discussion see Blundell-Wignall, Atkinson and Roulet (2012).

- the current Basel framework should be scrapped in favor of something vastly simpler;
- banks should be required to have meaningful amounts of capital to: (i) absorb losses so that local shocks do not become systemic; (ii) ensure a significant weight in bank decision-making for principals, i.e. owners, who face the consequences of their decisions rather than hired agents who can leave problems to taxpayers; and (iii) ensure the trust of creditors and counterparties which is required for financial institutions to fund themselves. A leverage ratio requiring core tier 1 capital of 5% of assets measured on an IFRS basis would seem to be a minimum, although more might be desirable – especially for poorly-diversified banks;
- the implicit guarantee that encourages banks to become too-big-to-fail needs to be limited. Separation of certain securities businesses (and notably derivatives) from commercial banking, when they move beyond a certain threshold, with each set of activities being ring-fenced effectively to end cross-subsidization is a key element here. A Non-Operating Holding Company structure, which has much in common with (but is more general than) the Vickers proposal in the United Kingdom, is the most promising approach. Such policies raise the pricing of risk in these activities (which should not be guaranteed by the official sector). In this respect it needs to be noted that simply moving some derivatives to central clearing platforms (CCP's) does not 'destroy' any excess risk – it simply moves it. The creation of CCPs increases the number of TBTF institutions, the competition between which may well underprice risk. Such firms will need capital like any other securities firm and will have to duplicate their margin and risk models;
- corporate governance of banks should be strengthened to encourage a more prudent balance between risk and search for return, notably by separating the roles of the CEO and Chairman of the Board and by ensuring that the CEO has no role in Board nominations.

Finally, as the discussion of China, Korea and other emerging countries suggests, integration of financial markets of emerging economies into the international system has lagged that of trade and production. As the shift of the center of gravity of the world economy towards Asia continues, greater participation of Asian institutions in the international financial system seems inevitable. Evolving regulatory reforms will have to accommodate this process so that Asian banks can play a constructive role in facilitating development and international adjustment, while avoiding the excesses of US and EU banks that were evident during the recent crisis.

REFERENCES

BAKKER, A.F.P., 1996, *The Liberalization of Capital Movements in Europe*, Kluwer Academic Publishers.

BLUNDELL-WIGNALL, A. and ATKINSON, P.E., 2008, "The Subprime Crisis: Causal Distortions and Regulatory Reform" in *Lessons From the Financial Turmoil of 2007 and 2008*, Kent and Bloxham (Eds.), Reserve Bank of Australia.

BLUNDELL-WIGNALL, A., WEHINGER, G. and SLOVIK, P., 2009, "The Elephant in the Room: The Need to Focus on What Banks Do", *OECD Journal*, Financial Market Trends.

BLUNDELL-WIGNALL, A. and ATKINSON, P.E., 2010, "Thinking Beyond Basel III: Necessary Solutions for Capital and Liquidity", *OECD Journal*, Financial Market Trends, Vol. 2010, issue No. 1.

BLUNDELL-WIGNALL, A. and ATKINSON, P.E., 2011, "Global SIFI's, Derivatives and Financial Stability", *OECD Journal*, Financial Market Trends, Vol. 2011, issue No. 1.

BLUNDELL-WIGNALL, A and ATKINSON, P.E., 2012, "Deleveraging, Traditional versus Capital Markets Banking and the Urgent Need to Separate GSIFI Banks", *OECD Journal*, Financial Market Trends, Vol. 2012, issue No. 1.

BLUNDELL-WIGNALL, A., ATKINSON, P.E. and ROULET, C., 2012, "The Business Models of Large Interconnected Banks and the Lessons of the Financial Crisis", *National Institute Economic Review*, No. 221.

BLUNDELL-WIGNALL, A. and ROULET, C., 2012, "Business Models of Banks, Leverage and the Distance to Default", *OECD Journal*, Financial Market Trends, Vol. 2012, issue No. 2.

CORSETTI, G., PESENTI, P., ROUBINI, N., 1998, *What Caused the Asia Currency and Financial crisis: The Policy Debate*, NBER Working Paper, w6834.

DE MELO, J., DHAR, S., 1992, *Lessons in Trade Liberalization in Latin America for Economies in Transition*, World Bank, Country Economics Department WPS 1040, November.

DOOLEY, M. and ISARD, P., 1980, "Capital Controls, Political Risk, and Deviations from Interest-Rate Parity", *Journal of Political Economy*, University of Chicago Press, vol. 88(2), pp. 370-84, April.

ECB, (2012, 2013), *Financial Integration in Europe*.

EICHENGREEN, B., 1999, *Towards a New International Financial Architecture: A Practical Post-Asia Agenda*, Washington, Institute for International Economics.

ENGEL, C., KLETZER, K., 1989, "Saving and Investment in an Open Economy with Non-traded Goods", *International Economic Review*, Department of Economics, vol. 30(4), pp. 735-52, November.

FELDSTEIN M., BACCHETTA, P., 1991, "National Saving and International Invest-

ment" in *National Saving and Economic Performance*, BERNHEIM and SHOVEN (Eds.), University of Chicago Press.

FELDSTEIN, M., HORIOKA, C., 1980, "Domestic Savings and International Capital Flows", *The Economic Journal*, Vol. 90, (June), pp. 314-329.

GOVERNMENT ACCOUNTING OFFICE, 2009, "Troubled Asset Relief Program: Status of Government Assistance Provided to AIG", *Report to Congress*, September.

HELLIWELL J.F. & MCKITRICK R., 1999. "Comparing Capital Mobility Across Provincial and National Borders", *Canadian Journal of Economics*, Canadian Economics Association, vol. 32(5), pp. 1164-1173, November.

MURPHY, R.G., 1986, "Productivity Shocks, Non-traded Goods and Optimal Capital Accumulation", *European Economic Review*, Elsevier, vol. 30(5), pp. 1081-1095, October.

OBSTFELD, M., 1986, "Capital Mobility in the World Economy: Theory and Measurement", *Carnegie-Rochester Conference Series on Public Policy*, Elsevier, vol. 24(1), pp. 55-103, January.

OBSTFELD, M. & ROGOFF, K., 2001. "The Six Major Puzzles in International Macroeconomics: Is There a Common Cause?", NBER Chapters in *NBER Macroeconomics Annual 2000*, Volume 15, pp. 339-412 National Bureau of Economic Research, Inc.

OECD, 2002, *Forty Years' Experience with the OECD Codes of Liberalisation of Capital Movements*.

OECD, 2012, *Economic Outlook*, Volume 2012/2.

RADELET, S. and SACHS, J., 1998, *The East Asian Financial Crisis: Diagnosis, Remedies, Prospects*, Brookings Papers on Economic Activity, Vol. 1.

STIGLITZ, J., YUSUF, S., 2001, *Rethinking the East Asian Miracle*, New York, Oxford University Press.

SUMMERS, L. and CARROLL, C., 1987, "Why Is U.S. National Saving So Low?", *Brookings Papers on Economic Activity*, Economic Studies Program, The Brookings Institution, vol. 18(2), pp. 607-642.

THE WORLD BANK, 1984, *Economic liberalization and stabilization policies in Argentina, Chile and Uruguay, A World Bank symposium*, Report No. 13361.

WILLIAMSON, J., 2004, *The Washington Consensus as Policy Prescription for Development*, lecture at the World Bank, Washington DC, January 13.

WONG, D.Y., 1990, "What Do Saving-Investment Relationships Tell Us About Capital Mobility?", *Journal of International Money and Finance*, vol. 9, pp. 60-74.

WYPLOSZ, C., 2001, "Exchange Rate Regimes: Some Lessons from Postwar Europe", *CEPR Discussion Papers* 2723, C.E.P.R. Discussion Papers.

7. From National Towards European/Global Financial Regulation

Charles A.E. Goodhart

7.1. Introduction

The global financial system that had been developing in the decades up until 1914 was shattered by the two World Wars and the inter-war crisis. The reliance on exchange controls over international capital movements by countries with weak Balance of Payments after WWII further segmented banking systems into separate national silos, especially in Europe. Thus banking in France, West Germany, Spain, etc., was then done primarily, almost solely, by respectively French, German, Spanish, etc., banks. With (almost) all banking done by their own national banks, each country could develop its own national arrangements and traditions of regulation and supervision. In Section 7.2., we outline how such national separation broke down in the early 1970s under the influence of:

i. the growth of the euro-dollar international wholesale financial market;
ii. the arrival in Europe, especially in London, of cross-border (primarily US) banks;
iii. the imbalances resulting from the oil shock; and
iv. the growing porosity of exchange control barriers.

This led to a shift of financial regulation to the newly (1975) established Basel Committee on Banking Supervision (BCBS). In some ways this title is a misnomer, since the BCBS has remained throughout the main centre for the promulgation of banking *regulation*, whereas such international *supervision* as has been done (as contrasted with national supervision) has been done heretofore by the IMF; though from 2014 onwards the ECB will also be acting as a supervisory body in the Eurozone.

Given the manifold difficulties of adjusting from a national to an international system of banking regulation, the early years of this (BCBS) regime were relatively successful. The same cannot be said about the subsequent period, 1998-2013. In Section 7.3. we recount these more recent international developments, focussing on the introduction of the Basel II Capital Accord and the build-up to the financial crisis of 2008. We attribute much of the blame for this to the intellectual failures of the regulatory authorities, though the (successful) attempts of the regulated banks to manipulate the regulations to their own advantage was a contributory factor, (and the economics profession as a whole gave hardly any useful guidance).

In the penultimate section of this chapter, Section 7.4., we then discuss various aspects of the crisis itself, such as the interplay between the boom/bust cycle in the housing market and the real economy, the decision to liquidate Lehman Bros, and the steps then taken to support the main banks. One remarkable feature has been that a leading narrative applied for explaining the crisis, that it was all the fault of 'casino' bankers undertaking speculative bets in opaque, exotic derivative markets, is largely false. The crisis mainly arose from a standard (retail-based) interaction between pro-cyclical (retail) banking and a widespread boom/bust in housing. This misinterpretation has engendered a cacophony of proposals on how to reform the regulatory system, many of which are of dubious validity.

Partly as a result, the way forward remains unclear. We end, briefly, in Section 7.5., with a discussion of where we might go from here.

7.2. THE EARLY HISTORY OF INTERNATIONAL REGULATORY COOPERATION; THE BASEL COMMITTEE ON BANKING SUPERVISION AND THE BASEL I ACCORD

In the aftermath of WWII, the financial systems of the countries of Europe were characterised by exchange controls on capital flows, especially on outward flows, and by direct controls over bank lending, such as the 'encadrement du credit' in France. During the reconstruction after the war, priority was given to lending to manufacturing and to export industry. Mortgage lending for house purchase was primarily done by specialised housing finance institutions, building societies in the UK. In general, competition in financial intermediation, especially in setting interest rates, was severely restricted, and tightening monetary policy often worked by causing a sharp drop of inflows into those financial intermediaries whose conventionally set interest rates lagged behind the fluctuations of more flexible market rates.

There was a widespread appreciation of the potential dangers of inflation, particularly in Germany after its two hyper-inflationary experiences; and the pegged exchange rate (Bretton Woods) system made everyone concerned about the effect of relative (unit labour cost) inflation on the current account, and also on those components of the capital account, such as the leads and lags of trade finance, as could not be controlled by the pervasive exchange controls. Where it was felt necessary, government deficit finance was protected and supported by financial repression, both forcing financial intermediaries to hold large ratios of domestic government debt as liquid reserves and preventing such intermediaries from competing aggressively with their own governments for financing.

Banking in Europe had become almost totally national in character. Thus banking in each country in Europe was done almost entirely by banks headquartered in that same country. Moreover, with the exception of those banks in European countries which undertook business in overseas dominions or colonies, e.g. UK in the Empire, France in Africa, Spain in Latin America, etc., there was little exposure of European banks to the outside world, including to other European countries. In 1965, for example, there were only a few foreign banks in London, of which only a minority came from other countries in Western Europe.

In such a fragmented, nationally-based context, regulation and supervision could, and did, develop separately in each country along lines that depended on the idiosyncrasies of that country's own history, institutional developments and thinking. Thus banking supervision was done within Central Banks in some countries, but in specialised supervisory institutions in others, with a variety of links to the Central Bank[1]. Given the restricted nature of banking, especially those direct controls on bank lending, there was little need for much direct supervision; in the UK, the Bank of England undertook limited supervision through the Discount Office, staffed by the Principal with a handful of more junior officials, and this sufficed well enough until the Fringe Bank crisis of 1973/74. There were few bank failures and no bank crises between 1945 and the 1970s.

This separate development of the national banking systems in Europe led to differing approaches towards the interactions between Central Banks and their respective commercial banks in the provision of liquidity support, and thus in the definition and requirements for holdings of liquid assets. Prior to the 1970s official controls over liquid assets ratios (and cash ratios) were regarded as more important than capital ratios and requirements. But, just as with differing treatment of liquidity, Central Banks, and separate supervisory institutions, also developed separate definitions, and preferred norms, for the capital funds that they would prefer their own banks to maintain.

The country where the banks had the greatest exposure abroad was the United States. It was then by far the economically most powerful nation, with the largest number of multinational companies. When abroad these companies naturally looked to their own US bank(s) for help with trade finance and other forms of

[1] Prior to the 20th Century, Central Banks were seen as being commercial banks with special powers and privileges, and hence also responsibilities; but still doing ordinary commercial business in competition with other banks. It was, therefore, unthinkable that they should have informational access to, and any control over, the asset portfolios of their banking competitors. In so far as they undertook prudential regulation, it was primarily over the quality of the assets that they might be called upon to discount in their role of lender of last resort, in the light of the real bills doctrine. In so far as banking crises led to calls for more direct supervision over banking portfolios, as occurred in several Continental European countries, this was done in separate supervisory bodies, established under the auspices of the Ministry of Finance. Similarly any requirements for the maintenance of cash, or liquidity, controls were originally usually introduced by the Ministry of Finance, rather than the Central Bank. It was not until after World War II that the Central Banks became generally seen as quasi-public, rather than private, institutions. Even then, the relationships between the Central Bank and the main commercial banks remained at arms-length in many countries. This broader topic is, however, outside the scope of this chapter.

financial support. Having benefited economically from being the arsenal of the West in WWII (and then again with Cold War rearmament and the Korean War), the US felt no need for exchange controls in the post-war period. So large, reputable European companies, faced with financing constraints in their own country could borrow in dollars from US banks and swap the funds into domestic currency for use at home. Such capital inflows were generally welcomed.

The Cold War had, meanwhile, been a major factor in the genesis of the euro-dollar market. Institutions of various kinds from Communist countries which earned dollars, for example from trade, did not want to place these with US banks, particularly when sited in the US, for fear that they might be blocked, should the Cold War flare up. So they began depositing such dollars with European banks, especially in London, and a market for such euro-dollar deposits sprang up there, encouraged by the Bank of England which was keen to see a revival of London's entrepot trade in foreign currencies. So long as sterling did not flow out, such entrepot trade was free of exchange controls.

In this context the development of an off-shore, unregulated, international euro-currency market appeared a serious threat both to the maintenance of the (pegged but adjustable) international Bretton Woods system, and to domestic monetary control. Barry Johnston in his book, *The Economics of the Euro-Market* (1982)[2], writes as follows, (pp. 11-16),

> "Throughout the 1960s, and indeed the 1970s, the Euro-currency market grew at a remarkable pace. In September 1963 – the earliest date for which systematic data are available on the foreign currency activities of European banks – the total short-term foreign currency assets of the commercial banks of nine countries reporting to the Bank for International Settlements was USD 12.4 billion (of which USD 9.3 billion was in US dollars). By the end of the decade this aggregate had grown by over 500 per cent to USD 63.4 billion (of which USD 53 billion were US dollars), i.e. at an annual compounded rate of around 31 per cent per annum…..
> [The] internationalisation of banking and the growth of the Euro-currency market was importantly stimulated by national controls and regulations introduced in the 1960s and early 1970s to restrict the international flow of short- and longer-term capital. These controls shifted the locus of international transactions to the Euro-currency markets and away from national banking systems. In early 1965 the introduction of the Voluntary Foreign Credit Restraint Program (VFCR) in the USA severely limited the ability of US domestic banks to lend directly to foreigners. The VFCR, which was part of a larger programme, including the Interest Equalization Tax (IET), introduced in July 1963, and the Foreign Direct Investment regulations (FDI), aimed at improving the worsening

[2] See also Dale (1984), especially Chapters 1 and 2.

US balance of payments by curbing capital outflows. Under the VFCR banks (and other non-bank financial intermediaries) in the USA were asked to keep their loans to foreigners and other foreign assets within a certain ceiling limitation, and during the period up to 1970 the foreign credits of US banks varied within a narrow range of USD 9.25 billion to USD 9.75 billion. However, as the programme applied only to the operation of US-based banks and not their foreign branches, it had the effect of shifting the foreign operations of US banks to their foreign branches and the demand for international finance to overseas markets, particularly the Euro-currency market.

Brimmer and Dahl (1975) document the very rapid expansion of the foreign branches of US banks which accompanied these controls. As shown in the Table below, at end-1964 only 11 US banks had established branches abroad, operating 181 foreign branches; however, by end-1973, just before the controls were taken off, there were 125 banks with a total of 699 foreign branches, and the total assets of these branches had risen from USD 7 billion to USD 118 billion. There was also a sharp increase in the so-called 'Edge Act and Agreement' corporations, which are domestically organised subsidiaries that serve as a vehicle for foreign banking and investment. The number of these rose from 38 in 1964 to 104 in 1973 and their assets from USD 0.9 billion to USD 6.9 billion."

Table 7.1: International operations of US banks: Selected indicators, 1964-73

	Category	1964	1970	1973
I.	*US offices*			
	Bank Credit to Foreigners (USD bn)	9.4	9.7	17.2
II.	*Overseas branches of US banks*			
	Number of banks with overseas branches	11	79	125
	Number of overseas branches	181	536	699
	Asset of overseas branches (USD bn)	6.9	52.6	118
III.	*'Edge Act/and Agreement' Corporations*			
	Number	38	77	104
	Assets (USD bn)	0.9	4.6	6.9

In the USA, under Regulation Q, ceilings were imposed on the level of interest rates banks were permitted to pay on deposits in the USA (but not their branches abroad). When credit was tight in the USA and market interest rates moved above the Regulation Q ceilings, banks in the Euro-currency market had an interest-rate advantage in attracting dollar deposits. The impact of these ceilings on the growth of the Euro-dollar market was particularly marked in 1968 and 1969 as interest rates rose during a period of credit restraint.

Western Europe domestic corporations also used Euro-markets as a source of funds when the supply of domestic credit was restricted. Under tight monetary

conditions West German enterprises were reported to have obtained about one-third of their total borrowing needs from abroad in 1970; and UK business firms borrowed heavily in the Euro-currency market during 1969-70 when there were quantitative limitations on the supply of domestic bank credit. In both countries controls on the import of capital had to be tightened to insulate the domestic market from external flows. On the other hand, the Italian authorities gave active encouragement to Euro-dollar borrowing by Italian corporations as a way of financing Italy's external payments deficit and as a supplement to domestic savings.

Other monetary regulations favoured the growth of the Euro-currency market. Unlike the situation in the US and West German domestic markets, Euro-banks were free from the requirement of holding non-interest-bearing reserve balances against deposits. These balances are held primarily for the purpose of domestic monetary control in these countries. The absence of these domestic regulations in the Euro-market enabled banks to offer higher deposit rates, and short-term Euro-dollar interest rates were usually some ½ per cent higher than in the US domestic market. Moreover, while it was illegal in the USA to pay interest on demand deposits and time deposits of less than thirty days, there were no such restrictions in the Euro-market. It was also reported that in making loans Euro-banks could operate on narrower lending margins, determined in a freely competitive market, than in national markets, where lending rates tended to be partly administered. This general freedom that the Euro-market enjoyed from regulatory constraints and the associated advantageous interest-rate terms it offered to both depositors and borrowers, the different constellation of geographical, sovereign and institutional risks in the Euro-market compared with national money markets, the relative freedom of capital movements and an emerging desire by wealth-holders to internationalise their investments, all added to the attractiveness of the Euro-currency markets to depositors and thus to the supply of foreign currency deposits to banks.'[3]

So the late 1960s and early 1970s saw an influx of branches and subsidiaries of US banks into most West European countries, and of both US and European banks into London to participate in the euro-dollar market, which was centred there. At an early meeting of the Groupe de Contact (June 1973),

> 'The respective participants noted that the following percentages of banking assets in their countries (roughly) was held in euro-currency assets:
> – Netherlands: 40%;
> – Belgium: 30% to 40%;
> – Luxembourg: up to 80%'
>
> Goodhart (2011), p. 27.

[3] Goodhart (2011), pp. 25-27.

Banking and finance were becoming international, global.

The first response by the supervisory community was to establish an unofficial discussion group, the Groupe de Contact,

> 'The circumstances leading up to the formation of the Groupe were as follows. On 25 February 1972, there was a telephone call between Herman Baeyens, then Deputy Director of the Commission Bancaire in Belgium, and Huib Muller, a young but middle-ranking official in the banking supervisory department of the Nederlandsche Bank. Baeyens wanted to discuss how to handle the proposals of an American commercial bank, which wanted to establish simultaneously in Belgium a subsidiary for managing domestic business and a representative office for dealing with non-domiciled international business. "Towards the end of this discussion Baeyens noted that it was a pity that there was no place where international supervisory issues could be discussed by those concerned."[4] Muller was of the same opinion, as he wrote in his note for the record on the telephone discussion, dated 28 February. In this he remarked that someone should take the initiative to set up such meetings. He was as good as his word.'
>
> Goodhart (*ibid.*), p. 13.

The members were supervisory officials from the initial six EEC countries, with the intention of soon adding the then four candidate countries, including the UK. The proposed initial agenda was:

> '1. Liquidity and solvency regulations;
> 2. Capital requirements, (e.g. treatment of hidden reserves);
> 3. Limitations on large exposures;
> 4. Philosophy on treatment of minority interests;
> 5. Handling of external (overseas) commercial bank offices;
> 6. Continuation of Groupe discussions on a permanent basis.'
>
> Goodhart (*ibid.*), p. 14.

The relationship between this unofficial group of EEC bank supervisors and the EC itself was cautious and wary. Robin Hutton (who died in 2007), who became Director of Financial Institutions in the European Commission once the UK joined the EEC in 1973, wrote to me (personal correspondence) to raise the question why it had taken so long to set up such a Groupe. Then he wrote that

> 'by the early 1970s it was, I believe, pretty clear to both bank managements and their national supervisors that the responsibility of the

[4] Translated from the original Dutch records in the archives of de Nederlandsche Bank for me by the Archivist/historian, Arnoud Glaudemans, to whom I am most grateful.

> supervisors had to become more extensive and complex – and more internationally cooperative – if the scope for disaster was to be minimised.
> One reason is that the heterogeneous structure of banking supervision, with some supervisors being within central banks and some without, complicated the process of international co-ordination. One possible additional reason for the slow process was the existence of doubts and uncertainty about the proper role of the EC itself in such an exercise. This vexed question continued to trouble the Groupe.
> Another possible cause for hesitation, at least for EEC member authorities, might have been the juxtaposition of their need for greater openness with each other with the efforts of national governments to move towards a Common Market in Banking. The Directives on Banking had been launched by the Commission of the Six, before the enlargement of the EEC to nine Member States in 1973, as part of a programme aimed at harmonising existing national legislations into a single body of Community Law. The drafting was done by German lawyers on the Commission staff and negotiated amongst civil servants of national government departments rather than banking supervisors – though some of the latter may have been consulted from time to time. This process may have given rise to a suspicion among several supervisory authorities that the Directives and their implementation might be too legalistic in both text and practice, restricting the fleetness of foot supervisors could often require. Thus there could have been some suspicion that politics might get in the way of proper action by supervisory authorities, especially when some prominent banks were State-owned.' Goodhart, (ibid.), pp 12/13, footnote 2.

The central role of the euro-dollar, or more generally the euro-currency, market was given a strong further impetus by the shock quadrupling of oil prices following the (fourth) Arab-Israeli war in October 1973 and the formation of OPEC. The oil producing countries received huge inflows of dollars, which initially they had no means of using domestically. So they placed these, in dollar form, primarily with the largest banks, and mostly in the euro-dollar market.

Those years, 1973/74, were at the tail end of a generalised boom, which was partly initiated by the final collapse of the Bretton Woods system in 1971/72. The disappearance of the discipline of maintaining a pegged exchange rate allowed several of the economically weaker countries, such as the UK, to make a dash for growth. Towards the end of this period of sharp credit expansion, banks and banking systems became fragile. Herstatt and Franklin National both failed in 1974, and the Fringe Bank crisis in the UK began at the end of 1973, (also see Chapter 12 in this Volume).

> 'The Economist, on 3 August 1974, pp 55-7, wondered aloud whether there might be 'A World Banking Crisis?' in the aftermath of Herstatt. This had three, interconnected, facets,
>
> "The three big international banking problems of the moment are the dangerous curb in foreign exchange markets, the uncertainty about how oil money will move in the two usual crisis months of August and September, and the way in which fears of crashes are causing money to be withdrawn from small banks all round the world."' Goodhart, (ibid.), p. 32

In particular, the growth of the Euromarkets, with large volumes of such deposits being channelled through the branches and subsidiaries of foreign banks in host countries (especially, but not only, in London), led directly on to the question of what were the relative responsibilities of the home, and host, authorities respectively for the solvency and liquidity of such foreign banks. This question was deemed sufficiently important to engage the direct interest of politicians, in the guise of a meeting of G6 Finance Ministers, together with their Central Bank governors, in France in September 1974. The French Minister, M. Fourcade, then,

> 'went somewhat further in his Press Conference than had been anticipated, and gave the impression that the G10 Central Bank Governors would be making an announcement at their subsequent Basel meeting, on the following two days, of measures to monitor and support the euromarkets. So, the Governors found themselves under intense pressure to come up with some form of words to that general effect.' Goodhart, (ibid.), p.38

The communique that the G10 Governors then agreed reads as follows:-

> 'At their regular meeting in Basel on 9th September, the Central-Bank Governors from the countries of the Group of Ten and Switzerland discussed the working of the international banking system. They took stock of the existing mechanisms for supervision and regulation and noted recent improvements made in these fields in a number of major countries. They agreed to intensify the exchange of information between central banks[5] on the activities of banks operating in international markets and, where appropriate, to tighten further the regulations governing foreign exchange positions.
> The Governors also had an exchange of views on the problem of the lender of last resort in the Euro-markets. They recognized that it would not be practical to lay down in advance detailed rules and procedures for the provision of temporary liquidity. But they were satisfied that means

[5] One could well ask why the IMF was not brought in to this. The answer, I believe, is that the Fund answers to political masters, and the Central Banks wanted to keep the politicians at bay on such issues.

> are available for that purpose and will be used if and when necessary.' Goodhart, (ibid.), p.39-40

The G10 Governors[6] had already set up an international macro-economic sub-committee, the Euro-currency Standing Committee, in April 1971. An obvious follow-up, particularly given the agreement set out in the second paragraph of the above Communique, would be to set up a second sub-committee to advise on international regulatory and prudential issues. Such a committee already existed in outline form in the Groupe de Contact, but this was a purely European, and entirely unofficial, body[7]. Moreover, several countries in the Groupe were represented by officials from specialised prudential authorities, not from their Central Bank. The G10 Governors got around this latter difficulty by having all countries send two representatives[8] to the new Committee, the first would be a prudential supervisory expert, and could come, as was institutionally appropriate either from the specialist supervisor or from the Central Bank, if the latter did the supervision. The second representative had to come from the Central Bank, and initially was to be a foreign exchange market expert. The member countries of this new Basel Committee on Banking Supervision were the G10 countries, Belgium, Canada, France, Germany, Italy, Japan, Netherlands, Sweden, UK and USA, plus Switzerland as host country, and Luxembourg (see previous footnote), twelve in all, of which nine were European. This Committee was initially called the Basel Committee on Banking Regulation and Supervisory Practices, but eventually got shortened to Basel Committee on Banking Supervision (BCBS). In the earlier years it was commonly referred to under the name of its Chairman, i.e. initially George Blunden (1975-77), and then Peter Cooke (1977-1988).

---

6 "The origins of the Group of 10 have to do with the borrowing powers of the IMF. The first credit lines established by the Fund to supplement its quota-based resources were the General Arrangements to Borrow or GAB. This was an agreement negotiated by the Fund with eight of the major industrial countries (United States, United Kingdom, France, Japan, Italy, Canada, Netherlands, Belgium) and the central banks of two others (Deutsche Bundesbank and Sveriges Riksbank) in 1962. (See Lastra, Legal Foundations of International Monetary Stability (2006), pp. 386-387. See Decision of the Executive Board No. 1289-(62/1) of 5 January 1962 with effect from 24 October 1962. The decision, as amended, is published in Selected Decisions of the International Monetary Fund, 25th edition (Washington DC: International Monetary Fund, 2000)). The G-10 or Group of Ten refers to the group of countries that agreed to participate in the General Arrangements to Borrow. Under this agreement, the members would consider supplementing the Fund's resources if further resources were necessary in order to finance the transactions of any of them with the Fund." Goodhart, (*ibid.*), pp. 10/11. Also see Chapter 1 in this Volume.
By the 1970s the occasional meetings of these Governors to consider Fund borrowing had been transformed into regular monthly meetings to review the state of the international financial system and to share confidential comments on economic developments on their own domestic economies.

7 When the American authorities, the Fed, learnt about the Groupe earlier in 1974, they proposed widening it to include representatives of Canada, Japan, Switzerland and the USA. The members of the Groupe were divided on how to respond, and delayed making any response. This question was then overtaken by the separate formation of the Basel Committee on Banking Supervision, see Goodhart (*ibid.*), pp. 22/23.

8 There were two exceptions to this. First, one of the founders and a leading figure of the Groupe was Albert Dondelinger of Luxembourg. So it was felt wrong to exclude Luxembourg from the BCBS, despite it not being a G10 member. But it was only accorded one seat. The other exception was the USA. Its segmented supervisory structure, with both the Board and the FRBNY having a direct interest from the Fed, plus other supervisory bodies, such as the OCC, FDIC and even the FHLB, wanting to be part of the action, especially after the Basel I Accord in 1987/88 put the BCBS in the public eye, meant that after 1987 the US usually sent four to six people to each meeting.

George Blunden was appointed the first Chairman, for background see Goodhart (*ibid.*), p. 43. He outlined the main functions of this Committee, first in his opening remarks for the first meeting in February 1975, and second in a paper prepared for a SUERF Conference and published in 1977.

The first (see Goodhart, *ibid.*, p. 45) reads:

> 'You have all received a copy of the record of the Governors' decision to establish this Committee. Five important points emerge from that record:
> (i) Our main objective is to help ensure the solvency and liquidity of banks;
> (ii) Our work should lead to further discussions among the Governors themselves;
> (iii) We should take as our starting point the summary report on existing regulations and supervisory practices already prepared by the B.I.S.;
> (iv) We should give particular attention to the need for an early warning system;
> (v) We should remember that the quality of work done in supervision is at least as important as the regulations themselves.'

The second, (pp. 195-6, reproduced in Goodhart, *ibid.*, p. 47) reads:

> 'The committee was established as a permanent standing committee, meeting periodically throughout the year, and not as an ad hoc committee to perform a particular task against a time limit. Dr. Zijlstra, the President of the Nederlandsche Bank, who is also President of the Bank for International Settlements and Chairman of the Group of Ten Governors' Committee, laid down that the committee's objective should not be to make far-fetched attempts to harmonise the twelve countries' individual systems of supervision, but should be to enable its members to learn from each other and to apply the knowledge so acquired to improving their own systems of supervision, so indirectly enhancing the likelihood of overall stability in the international banking system. And the committee was particularly charged to bear constantly in mind the need for means of improving international early warnings of potential troubles in banking systems where these troubles might cross frontiers.'

The first job of the BCBS was to sort out the relative responsibilities of home and host supervisory authorities for the subsidiaries and branches of foreign banks, (including the more complicated case of joint ventures). This had already been discussed at the Groupe de Contact, and Huib Muller, one of the leading lights of the Groupe and then appointed to the BCBS, (where he subsequently became Chairman and died in harness), produced the definitive paper on this shortly after the first meeting; briefly (for a longer version, see Goodhart (*ibid.*), Chapter 4, Section A), the host country was primarily responsible for the arrangements

relating to the liquidity of foreign banking establishments within its jurisdiction, whereas the home authority had the main responsibility for the solvency of cross-border establishments. While this responsibility was absolute in the case of branches, it would also be "advisable" for host countries to concern themselves with the solvency of foreign bank subsidiaries in their own countries. Another main focus of work was to apply the principle of consolidation for the supervision and balance sheet auditing of cross-border international banks, work which became known as the "Concordat".

The main concern of the G10 Governors, when setting up the BCBS, had been a potential crisis in the uncontrolled, vast and rapidly growing euro-dollar market. This did not happen in the 1970s; indeed the large banks played a useful role in recycling funds from oil-producing countries to oil-importing countries, especially in Latin America. With nominal interest rates tending to lag behind inflation, and with growth in those countries doing quite well, such international credit flows caused few problems at that time.

Nevertheless capital ratios were falling, and there was beginning to be anxiety about capital adequacy by the start of the 1980s. The real catalyst for change, however, was Volcker's shift of monetary policy on October 4, 1979, from setting an official (Fed Fund) interest rate to a non-borrowed reserve base system. The purpose of this change was to allow much more flexible upwards movement in interest rates, in order to defeat inflation in America. Subsequently interest rates rocketed upwards, leading to a short, sharp deflation in 1981/82, and a collapse in the value of Latin American exports. Neither the bankers nor the sovereign borrowers in Latin America had appreciated how quickly a previously successful pattern of sovereign bank loans could become completely unsustainable.

Mexico, Argentina and Brazil then threatened (1981) to default. With their loans to such countries now trading at a much lower market value, almost all City Centre US banks, and probably some large European banks, would have been bankrupt on a mark-to-market accounting basis. Although the crisis was in practice averted (in part by a combination of forebearance and ever-greening) Congress was horrified that the US banks had run down their equity capital sufficiently to get into such a parlous state. Congress threatened to raise capital adequacy requirements (CARs) unilaterally on US banks. But foreign banks, especially, but not only, Japanese banks, (the 1970s and 1980s having been the high tide for Japanese economic expansion), had become widely established in the USA. The American banks lobbied Congress on the basis of the level-playing-field argument, arguing that raising CARs on them alone would just lead to transfers of intermediation (disintermediation) to foreign banks. So Congress mandated Volcker to go to Basel to obtain an international agreement, via the BCBS, to raise CARs throughout the G10 countries, and perhaps everywhere.

The problem was that the BCBS worked by consensus. As a committee of supervisory officials set up by a, somewhat self-appointed, group of large country Central Bank governors, it had no ability to require, sanction or force anybody to do what they did not want to do. But there was no consensus on the best definition of capital, or on its appropriate ratio to asset(s). The American experience led them to prefer a simple leverage ratio, but the Europeans, who had far more seats at the BCBS, were emphatically determined to relate capital to assets weighted by their purportive risk (risk-weighted assets, RWA). While the American representatives at the BCBS did not seek to stop the European majority from proceeding on a RWA basis, they were far less able, than their European colleagues, to push BCBS agreements through their own legislature (Congress). The Europeans found their American colleagues hard to deal with in the sense that there was always a feeling that hard-fought BCBS negotiations could be negated, or distorted, by subsequent political manoeuvring in Congress. Nevertheless the overwhelming importance of the US economy, of the dollar, of the euro-dollar market and of US banks in Europe meant that every effort had to be made to keep the USA on-side. The effect of the withdrawal of the USA from the League of Nations and from the BIS in the interwar years remained on everyone's mind.

Not that the Europeans always maintained a united front. As earlier noted, prior to the 1970s, each nation had developed its own approach to liquidity and solvency management. In particular, Germany had a different banking system and a different approach to the appropriate definition of capital. The German representatives remained obstinate; negotiations went on interminably and unavailingly. Eventually it took a power-play by the USA and the UK, with the slightly grudging acceptance of the Japanese, effectively to threaten to introduce their own agreed version of a CAR unilaterally onto their own financial markets, to force negotiation of a compromise package through at the BCBS. This turned out to be the Basel I Accord, negotiated in 1987 and introduced in 1988.

At much the same time the BCBS also tried to reach a similar Accord on liquidity management and required ratios, see Goodhart (*ibid.*), Chapter 9. But, once again, national practices had become customary and had hardened in the decades after World War II. Which assets are liquid depends in some large part on which the Central Bank will discount or accept as collateral for a loan, and the various Central Banks had adopted different practices which they were loathe to give up. So there was no consensus. Having just been through a bruising battle to force agreement on capital, CARs, Central Bank governors had much less stomach for another set-piece struggle. Moreover, they all comforted themselves that agreement on CARs, by supposedly ensuring solvency, should always allow banks that abided by the Basel Accord(s) to access the wholesale (e.g. euro-dollar) markets, so that funding liquidity could then become an acceptable substitute for asset

market liquidity. During the decades from the 1970s onwards, until 2009, asset liquidity in banks declined sharply.

As was their wont, the BCBS, and the G10 Governors, regarded this Accord as applicable only to themselves. While they recommended its adoption by other developed countries, e.g. countries such as Australia and Norway, they were (pleasantly) surprised by the alacrity with which its precepts were adopted in almost all other (non-communist) countries. But they did not then see themselves as having any responsibility for non-G10 countries, though they did establish a close liaison with a working group of supervisors from off-shore centres, (partly through the enthusiastic good offices of Mr. Colin Powell of Jersey).

What changed their position was a generalised desire that prudential supervision be strengthened in emerging market countries, which got political support at the June 1996 G7 Finance Ministers and Heads of State meetings. Initially the BCBS was rather reluctant and sniffy about taking on such a role vis-à-vis non-G10 countries. But when it became apparent that, if the BCBS would not take on this task, then the IMF would, their tune changed abruptly. There was a meeting between the Chairman of the BCBS, Tommaso Padoa-Schioppa and Manuel Guitian of the IMF in 1996, at which it was agreed that 'rule-making' would remain in the hands of the BCBS, whereas examination of how all the various countries were abiding by the various regulations, standards and codes would be a job for the IMF, in what then became its Financial Sector Assessment Program (FSAP) exercises. The BCBS' paper on 'The Core Principles for Effective Banking Supervision' was then rapidly prepared and published (in September 1997).

So, by the middle/end of the 1990s the status of the BCBS had changed and widened. From being a new, small, unofficial Committee of supervisory officials providing consensus advice to their own Central Bank Governors, it had become the quasi-official financial rule-making (regulatory) body for banks throughout all the world. Even from the very start, however, the BCBS became the main focus where European, as well as global, regulatory issues were discussed and hammered out.

> 'The tension between the need for international harmonisation and national jurisdiction has been particularly marked within the European Union, and finding ways to overcome this tension has been a leitmotif of the European Commission. So, the BCBS has usually operated in tandem, with complementary groups acting at the EU level, such as the Groupe de Contact and the Banking Advisory Committee (BAC)[9] . Nevertheless, given the leading role of US financial intermediaries in the world's financial system, and the large role of those from Japan, it was clearly

[9] Moreover the supervisory officials from the Central Banks would move interchangeably between the BCBS and the various purely European supervisory bodies.

> preferable to agree on a common regulatory basis amongst Europe, North America and Japan, rather than for the Europeans to follow an entirely separate approach that might be unacceptable to their American and Asian colleagues.
>
> While the various strictly European bodies, such as the BAC, would most often be discussing identical issues simultaneously with the BCBS, for example on supervisory consolidation, capital adequacy, maturity mismatch in the euro-markets, and so on, it became in practice the BCBS where the main decisions were taken, with the EC Directives transcribing the positions agreed within the BCBS. This is not to suggest that the BCBS overrode European concerns, rather the reverse.' Goodhart, (ibid.), p. 2.

Thus nine of the twelve countries represented on the BCBS were European (the several G10 members, plus Switzerland and Luxembourg). The Europeans forced through their preferences, e.g. on the use of RWAs and the zero-risk-weighting of OECD sovereign debt, even when subsequent experience indicated that the American position was better founded[10].

7.3. RECENT INTERNATIONAL DEVELOPMENTS, 1997-2013: BASEL II, THE FINANCIAL CRISIS (2008 ONWARDS), FINANCIAL STABILITY BOARD

The Achilles heel of the Basel Accords has lain in the conceit that the authorities could ascribe (constant) relative risk weights to various bank assets. Initially this problem had two main facets. The first related to sovereign bonds. The American representatives had wanted to treat the sovereign bonds of a bank's *own* country, e.g. the Italian sovereign bonds held by Italian banks, as effectively riskless, whereas the sovereign bonds of any *other* country should have a risk weight, perhaps depending on its credit rating. The Europeans demurred. They insisted that the sovereign bonds of *any* member country of the EEC should be equally regarded as riskless, irrespective of whether they were held by the banks of that, or another, country. They got their way. But, if one was going to treat the sovereign bonds of Italy, or Greece, as riskless, one could hardly regard the sovereign bonds of Australia or New Zealand as riskier. The solution that was found, not happily but as the best of a set of poor options, was to treat the sovereign bonds of all OECD countries as riskless, and those of all non-OECD countries as being of, equal, fairly low, but not zero, risk.

[10] But when the Americans felt pushed too far, they would simply ignore BCBS' agreed positions.

Initially, in the 1980s and 1990s, this separation into non-OECD goats and OECD sheep caused umbrage amidst the financially stronger non-OECD countries, especially middle-East oil exporters, and a special exception had to be made for Saudi Arabia. Thereafter cynics noted that promotion of a country to inclusion in the set of OECD countries, and hence with supposedly riskless sovereign bonds, seemed on a number of occasions to be followed quite closely by a financial crisis, during which a sovereign default appeared, at least for a time, to be possible. This happened, for example, with both Mexico and South Korea.

More recently, however, the travails of the peripheral countries of the Eurozone, such as Greece in particular, but also Cyprus, Ireland, Italy, Portugal and Spain, has made the treatment of their sovereign bonds as riskless, when in the portfolio of a bank headquartered in some other (European) country, patently ludicrous. Presumably this nettle will sometime be grasped, and the BCBS will retreat to the initial, and more sensible, proposal that the Americans had put on the table in the mid-1980s.

Although the Europeans were adamant in their demand that CARs should be related to RWAs, they were aware that their capacity to assess risk was limited, to say the least. Much of the demand to use risk weighting arose from a desire to treat bank holdings of public sector debt as riskless, relative to riskier claims on the private sector, rather than from any conviction of their superior analysis of risk. Accordingly with limited time and limited expertise, the BCBS negotiators divided bank assets up into very broad risk 'buckets'; all the assets in each 'bucket' would then have the same risk weight.

In particular *all* bank loans to private sector borrowers were placed in a high (100%) risk category under Basel I, irrespective of whether they were made to the largest, safest company around, or to a fly-by-night one-man bucket-shop. This meant that a huge discrepancy developed between the (low) amount of 'economic' capital that a bank would want, for its own purposes, to maintain against loans to safe private sector borrowers and the much higher required regulatory capital. Per contra, the regulatory CAR on loans to 'bad' borrowers was often below that which the banks would want to keep as 'economic' capital for their own protection.

Clearly there was now a profit to be made by on-selling the *better* private sector loans to non-bank financial intermediaries who did not have to maintain the 'excessive' banking CARs on such assets. The way that this was done, for legal, administrative and transactional reasons, was to bundle such loans up into a new securitised form. Initially such securitised products were sold to traditional non-bank financial intermediaries such as insurance companies and pension funds. Increasingly, however, banks came to appreciate that they could establish associated shadow-banks, e.g. in the form of Structured Investment Vehicles

(SIVs), which could use (short-term) finance obtained from wholesale markets (*not* deposits) to support collateralised, securitised loans of various kinds, such as Collateralised Mortgage Obligations and Collateralised Debt Obligations (CMOs and CDOs); and do so with a much reduced CAR.

These were decades of increasing financial liberalisation, especially in lending to persons, in the shape of credit and loans, mortgages offered to a wider range of potential borrowers (e.g. sub-prime), automobile loans, student loans, etc., etc. As Lord Turner has noted (2010) banks were lending relatively much less to industry, where the bigger firms were now looking more to capital markets for finance, and were now intermediating primarily between borrowing and lending individuals. Meanwhile, this financial liberalisation was causing the growth rate of (bank) credit to be significantly greater than that of bank deposits (Schularick and Taylor (2009) and Jorda, Schularick and Taylor (2012)). In the previous century before about 1970, indeed as far back as the data enable one to go, bank credit expansion and bank deposit expansion had risen hand in hand. Over the next 35 years they diverged, with bank credit growing considerably faster than bank deposits. This was facilitated both by the process of securitisation and by increasing resort to non-deposit wholesale funding, plus the associated rapid expansion in shadow banking.

Such developments were partly driven by regulatory arbitrage, and this worried the regulators. In particular, securitisation was intentionally shifting the best private sector assets out of the banks, and leaving them with the worst quality private sector assets. Basel I appeared to be having the effect of turning 'good' banks into 'bad' banks, and that was unacceptable. This was the background context in which work on Basel II got under way towards the end of the 1990s.

The other main feature of the time, the mid to late 1990s, was that the analysis of risk (and of potential return), especially by commercial banks, was becoming far more quantitative, i.e. based on mathematical models, and hence supposedly more 'scientific' than before. The key innovation in the field of risk measurement was the development, by Harry Markowitz in 1952, of the Value at Risk (VaR) metric. So, when the officials at the BCBS turned to the assessment of Market Risk in the mid 1990s, and circulated a draft paper based on the prior system of separate risk buckets, they were told, correctly, by the banks to whom they had circulated their Working Papers that their analytical procedure was old-hat and deficient. The regulatory officials accepted this criticism, and rushed to catch up on their model-building analytical technique, setting up modelling sub-committees, etc. But the private sector could hire more, better-trained 'quants', and the regulatory community became 'cognitively captured' in the sense that it was not only prepared, but actually keen, to use techniques and methods for risk assessment developed by the industry for regulatory purposes.

This was a mistake. This is *not* because the techniques and measurements developed by the private sector were consciously biased and self-serving, but because they were developed for different purposes. The objective of the VaR was to tell top management how risky its own portfolio was currently. And almost all the time (risk/return) conditions are (log) normal. But financial returns exhibit fat-tails (excess kurtosis) and downwards skew. So VaR based on an assumption of normality, is a poor measure of extreme risk. This is of less consequence to the bank manager, since in major crises the authorities will have to respond with policy measures, but the effect of such crises should, of course, be central to the concern of the relevant authorities. Historically based measures of VaR are not so subject to this critique so long as a major crisis occurred during the data period. But long periods of crisis-free outcomes, for example 1993-2007 in most of Europe, will have led to a diminishing appreciation of risk, and in a supposedly 'scientific' manner to boot.

Not only did VaR focus, perfectly reasonably from the viewpoint of the bank manager, on normality rather than on panic and crisis, but also it focussed, as it should from a managerial viewpoint, on each single institution (micro-prudential) rather than on the system as a whole (macro-prudential). From a micro-prudential standpoint, the senior tranches of a collateralised mortgage based security were, both historically and theoretically, very unlikely to default (as remained the case even after 2008). They could, therefore, on such grounds be treated as AAA and as virtually riskless, with a very low (or zero) risk weighting. But in a crisis, when correlations all tend to go to unity, no one will still feel so confident about estimating their future probability of default (PD), and their (mark-to-market) value may decline sharply. Since all banks will be led, in part by the regulations themselves, to be holding large amounts of such AAA assets, the effect on the valuations of the trading book, (plus guesses about their banking book), and hence on their profitability and perceived solvency, of such falls in value may well be systemically much more severe than falls in value, *and* non-performance (and default), of supposedly much riskier assets against which the banks have put protective capital in place. A problem of micro-prudential regulation is that it, semi-consciously, tends to force all banks to hold roughly similar portfolios; one aim of regulation always having been to bring all banks into line with the standards of the 'best' banks. This is fine so long as the adverse shocks are 'small'. When, however, the adverse shocks are big enough to challenge the prior estimates of PD and valuations of previously supposedly-safe assets, this can lead to even greater contagion and a more precipitate collapse.

The next point is that the current measurements of risk, via VaR, and of profitability, via mark-to-market valuations, tend to be highly procyclical. During periods of upwards trending asset prices, variances and co-variances tend to go down; correlations fall; volatility as measured in various ways appears to be low.

The greater reliance on VaRs and bank-based measures of risk, in Basel II than in Basel I, and the increasing use of mark-to-market valuation were bound to make the whole system much more procyclical than had the previous more rough and ready regulatory approach. This was *not* because the private sector metrics were intentionally malign or intended to 'game' the system. It is rather that the regulators failed to realise that a procedure developed for private sector commercial purposes was inappropriate for public and social regulatory needs. It was one of the boasts of the authors of Basel II that they had brought regulatory capital requirements into line with the economic capital requirements that banks would want to hold on their own account. How misguided can one get?

This was then the context from which Basel II emerged. It sought to correct the distortions to the patterns of credit expansion that Basel I had engendered, primarily by adjusting regulatory requirements to align with the risk metrics developed in the private sector for their own (perfectly proper) purposes. While it did do some good work, e.g. in clarifying the relationship between off- and on-balance sheet requirements, it not only increased the complexity of regulation, now a rising complaint, but it also made the whole system much more procyclical and fragile in a way that was difficult, even, perhaps especially, for regulators to observe. Most banking systems seemed highly profitable, and on a Basel II RWA basis well capitalised in the early summer of 2007, (including Northern Rock). Some economists, White at the BIS, Ragu Rajan, and several of us at the Financial Markets Group (2001) worried that the inherent fragility of the system was being obscured by the procyclicality of Basel II, but, given the temper of the times, nothing was, or probably could have been, done.

Basel II focussed on the redefinition of asset risk weighting. It did not seek to revisit the definitions or the numbers (i.e. 4% Tier 1, 8% of Tier 1 and 2) of capital contained in Basel I. Nor did it attempt to reopen the question of liquidity requirements that had been put to one side by the BCBS in the mid-1980s.

Getting agreement on the definition(s) of capital, as the basis of CARs, had been, perhaps, the most difficult aspect of Basel I. At the start of the new millennium there seemed little need, and there was no stomach, in the BCBS to reopen that issue. But, behind the scenes and mostly out of sight, the quality of the capital, notably in Tier 1, was being eroded. Banks came up with all kinds of schemes for 'hybrid' capital, partially equity-like and partially debt-like, and tried, with varying degrees of success, to get regulators to accept these for Tier 1 and 2. The available holdings of Tangible Core Tier 1 equity fell, in some cases, well below 4%. The simple leverage ratios in Europe, relating such equity to total assets rose in many cases to over 40 to 1, and in some cases to over 50 to 1. It would not take much in the shape of declines in asset values to wipe out the available stock of loss-absorbing equity. At the time, pre 2008, most regulators did not realize

this. With the benefit of hindsight the German position, prior to Basel I, seeking to focus on a much stricter and purer definition of capital, seems to have been eminently justified, and we have gone back to that in the course of Basel III. Bankers were probably more aware of the inherent fragility of the system than the regulators, hence the early closure of the unsecured interbank markets in 2008. Where they differed amongst themselves were between those who thought, and acted on the supposition, that the downturn in the housing and mortgage markets were temporary and reversible (and these tended to fail), and those who took the opposite view and properly hedged the systemic housing risk.

Nor did Basel II attempt to reopen the issue of liquidity requirements. During these years, in most countries, holdings of lower-yielding, but more liquid assets, mostly public sector bonds were being run off and being replaced by less-liquid mortgage-backed assets. Market liquidity was being replaced by funding liquidity, and 'sticky' deposit funding by more volatile and, effectively shorter-dated, wholesale market funding. The extent of (underlying) maturity mismatch was increasing. The general presumption was that, so long as macro-economic stability was maintained, by the achievement of inflation targets, and so long as bank solvency was assured, by adherence to the Basel II CAR targets, that the wholesale markets would always be open for the provision of liquidity to banks in need of it.

Unfortunately successful achievement of inflation targets did not prevent a bust in the housing market in several countries. Despite prior adherence to Basel II, the fragility of the CARs in practice did not mean that banks remained confident of each other's solvency, and as a consequence the wholesale markets for liquidity dried up. The crisis began.

During the decade leading up to the crisis, the arena where regulatory issues were hammered out remained the BCBS, with European directives adopted subsequently in line with the decisions previously taken there. But the increasingly global scope of BCBS regulatory rulings meant that membership had to be diluted, weakening somewhat the majority of the European members. The BIS, along with the BCBS, was becoming global in character and membership, rather than just G10 (and primarily European) based. Moreover, market finance was in several countries, especially in the USA, growing in importance relative to bank finance. Bank regulation came under the aegis of Central Banks; capital market regulation did not; and the regulation of insurance was yet another separate field. Whereas the interaction between bank regulators and insurance regulators has been distant, and, possibly as a consequence, quite amicable, the relationship between bank and capital market regulators has been much closer, but possibly as a result more fractious, with both sides often arguing over turf. To

try to provide oversight and unity, this led to the establishment of the Financial Stability Board, senior to BCBS, IOSCO and IAIS in April 2009[11].

7.4. CRISIS AND THEREAFTER

Prior to 2007, banks, property developers and individuals levered themselves up to the hilt to take advantage of the continuing rise in property values. This was encouraged and abetted in several ways by governments, notably in the USA where constraints on the ability of Fannie Mae and Freddie Mac to support lower quality loans were not only lifted but reversed, in effect requiring them to support more such lending. Governments in countries with housing booms, such as the USA, UK, Ireland and Spain, treated the resultant higher tax receipts not as temporary windfalls, but as permanent additions to revenue, and expanded expenditures to match. Credit rating agencies in the USA, basing their models on US housing data since the 1950s, during which time there had never been a significant nation-wide downturn in housing prices, extrapolated this comfortable past into the future, and so gave mortgage based securities AAA ratings, and thereby enhanced the enthusiasm of banks facing a risk-weighted CAR to buy them. Banks in countries without a housing boom of their own (such as Germany and Austria) made up for their disadvantage by buying large volumes of such Mortgage Backed Securities (MBS) from banks (and countries) with such a boom. There is a myth developing that the financial crisis was caused by investment banks ('casino' banks) betting, via proprietary trading, on complex derivative instruments. It was not. Lehman's derivative trading was profitable. Its downfall was caused by its excessive long position on MBS. Mortgage lending is part of the bread and butter (retail) part of banking. It was bad retail banking (Northern Rock, HBoS, Anglo Irish) that was the problem.

Macro-economists, notably at the Bank of England, frequently sang a similar Panglossian tune. There was nothing dangerous about the boom in housing prices. It was just a reflection of the low real interest rates, it was argued. By raising house prices relative to the price at which houses were originally bought, via a mortgage, it raises house owner equity, and thereby makes them safer. There was no wealth effect from higher house prices.

[11] The FSB was established in April 2009 as the successor to the Financial Stability Forum (FSF). Their website features documents and statements of both the FSF and the FSB.
The FSF was founded in 1999 by the G7 Finance Ministers and Central Bank Governors following recommendations by Hans Tietmeyer, President of the Deutsche Bundesbank. G7 Ministers and Governors had commissioned Dr Tietmeyer to recommend new structures for enhancing cooperation among the various national and international supervisory bodies and international financial institutions so as to promote stability in the international financial system. He called for the creation of a Financial Stability Forum.
G7 Ministers and Governors endorsed the creation of the FSF at a meeting in Bonn in February 1999.

Economists take a particular pleasure in demolishing common beliefs, in this case the standard dinner-party view (in the decade up till 2007) that consumption was buoyed up massively by a wealth effect from housing prices. And in certain circumstances they are correct. Assume that new buyers have to buy their house entirely out of their own saved funds, and that existing house owners know the date of their death and can borrow to consume against their house, so that on death their borrowing is exactly repaid against the current value of their home. If the ratio of prospective buyers to existing householders is constant, the wealth effect out of rising house prices is zero. If the ratio of new buyers rises, the wealth effect could become negative, and house prices are likely to rise more when that ratio rises.

Let us, however, change the assumptions, and allow new buyers to borrow 100% of the value of the house (an LTV of 100%). They do not need to save in order to buy. Yes, but equally the existing house owner cannot use the equity in his house in order to borrow and consume, since his house is already fully mortgaged. So has nothing changed? In fact it has. Previously when house prices increased, the need for the new buyer to save more offset the benefit to the existing house owner. Now, assuming that expectations of future house price changes are not regressive, with 100% loan to value ratios, the *rise* in house prices leaves the new buyer unaffected (indeed *better placed* if expectations are extrapolative) while the existing house owner can borrow, and consume more against her higher equity. Thus a rise in LTV has a triple whammy. It brings more buyers into the housing market, thereby raising housing prices and pushes the system into a situation whereby increasing housing prices have a strong wealth effect. Of course, declining LTVs, which became general after a downturn in the housing market and the subsequent financial crisis, have the reverse effect.

Moreover, in the course of a major (housing) depression, the authorities are caught in a bind. If they allow foreclosures to continue when borrowers cannot pay, the downwards spiral of housing prices will accelerate. But, if they protect mortgage borrowers from eviction, as in Spain (and to some extent Ireland) recently, there is a threat of a snowball of non-performing loans (NPLs), which would endanger the solvency of the banking system. If ever there was a case for forbearance and book-value (i.e. *not* mark-to-market) accounting in banks, this is probably it (as has been so far carried out surreptitiously but successfully in the UK).

What is remarkable in Michael Lewis' book, *The Big Short*, is that most of those who could see the growing probability of a sharp reversal in the housing market were loners, people who were immune from conventional wisdom, and tried to think everything out for themselves, from first principles. In contrast, the general view, up until 2006/7, was that housing prices would generally rise faster than goods and services prices, and at worst might stagnate for a few years. If so, your

house was, indeed, your piggy-bank, and the sooner you got onto the housing ladder, the better.

However, the resultant rise in housing prices, often fuelled by financial liberalisation (and rising LTVs), stimulated supply (except in the UK where restrictive planning laws held sway). The share of construction (including real estate services) rose considerably, in the USA from 16.4% in 1995 to 17.4% in 2006; in Spain from 25.4% to 28.2% in those same years; and in Ireland, (not including real estate services), from 8.7% to 9.9% in those same years. Eventually supply began to overtake demand, and from late 2006 onwards, house prices in certain parts of the USA began to decline.

But the weaker parts of the US mortgage market, notably sub-prime, were predicated on an assumption of steadily rising housing prices, and made perfect sense in such a context. When housing prices began to decline instead, such borrowers could no longer refinance on steadily better terms and instead defaulted. The resulting foreclosures then reinforced the downwards housing price spiral. All this led to upwards revisions of expectations of PDs on MBS, and downwards shifts in prices of such securitised assets. Uncertainty grew about the proper valuation of such assets, and the 'marks', or valuations, made by the various banks. Since such banks, and other informed investors, knew, partly from their own experience, how thinly most other banks were capitalised with loss-absorbing equity, in the face of a significant price decline in a major asset class, they began to pull out their funds from wholesale markets (the run on the repo). This reduced the liquidity of the banks most at risk. In so far as they then tried to sell MBS on the market, this just further decreased their price (fire sales), thereby giving an additional twist to the contagious downturn. As noted earlier, the banks had previously divested themselves of asset market liquid assets that they could use instead of funding liquidity, when the latter dried up.

So, the banks turned to their Central Banks for help, as usual claiming that this was simply an (unjustified) liquidity shortage, and their solvency remained strong, (as was then correct on a *backwards-looking* basis, but usually not so on an informed forwards-looking basis, which was why the informed investors were fleeing!) Many Central Bankers found it hard to see what the fuss was about, having been led by the mark-to-market accounting values in mid 2007 to believe that their banks were so flush with profits and capital as to be in an unusually strong position. But their metier is to provide liquidity support when their banking and financial system needs it, and they did so with more or less grace, least in the Bank of England, fretting about moral hazard, and most in the ECB.

The provision of liquidity, in mid/late 2007, saved the day temporarily, but did not arrest the continuing slide in the price of housing and, hence, of mortgage-related securities. This began to bring about a series of failures in those institu-

tions combining greater exposure to such MBS with a thinner equity buffer, first Bear Stearns' acquisition by JP Morgan Chase was completed in May (after receiving liquidity support by FRB in March) and then Fannie Mae and Freddie Mac in September 2008. These were not forced into closure and liquidation, but supported in a variety of ways, leading most observers to expect similar support in future cases.

But such support also led to severe criticism, citing 'moral hazard', the benefits of penalising failure, Schumpeterian creative destruction, inappropriate use of taxpayer funds, invalid use of Central Bank powers, etc. So, when the next such case came along, Lehman Bros, on 15 September 2008, and the other big banks did not, or could not, take over (its losses), Secretary of the Treasury, Hank Paulson, claimed that he had no mandate to use taxpayer funds to rescue it, and that it would have to be closed and liquidated. Although the decision is understandable, it is possibly the single worst economic choice made, at least in modern times. Partly because there was no proper procedure for such a massive liquidation (notably of Lehman's London subsidiary), and partly because the decision was so contrary to prior expectations and left everyone uncertain of the new ground-rules, the result of the Lehman failure was chaotic and disastrous.

If a utility such as a water, gas or railway company goes bankrupt, the real assets of such a company are not sold for scrap. They remain in place, and are run in the last resort by the government, if no private sector buyer can be found. Since the assets of a bank are its human capital, information and know-how, liquidation is the equivalent of selling the gas mains, or railway tracks as scrap metal; in short a silly idea. As with utilities, the management, shareholders, and a selection of other creditors should lose out, but the bank or at least the better, salvageable, parts of it should continue.

Be that as it may, the economic disruption attendant on the Lehman failure was so dramatic (and the memory of what happened in 1929-33 taken as a warning) that any further unravelling of the financial system had to be prevented. This began with the rescue of AIG. Since AIG was brought down by its sale of credit default swaps (CDS), this could be labelled as betting on complex derivatives, but from another view it was no more than a concentration of credit risk, a standard component of banking/financial failures down the years.

What then happened in October 2008, following a British initiative, probably emanating from the Bank of England, but for which the then Prime Minister, Gordon Brown, took the credit, was that the public sector in each country stepped behind all its large banks in all the major developed countries, by injecting equity funds for recapitalisation, by guaranteeing debt repayment, and by the provision of additional liquidity on beneficial easy terms. It is certainly arguable that the terms of such assistance were in some cases made too comfortable for

bank managers, shareholders and creditors, but overall it was probably the best, most efficient, use of public funds that can be imagined. The alternative counterfactual of allowing a contagious, cumulative collapse of the financial and banking system would have been horrendous. Chapter 12 of this volume handles the subject of financial crises.

But that support was extremely expensive, especially in countries which had combined a housing boom with banks which were large in comparison with the economy of the home country. Ireland and the UK were leading examples, but Spain, Iceland, Switzerland and even the United States had some of the same features. Especially in countries which did not have their own currency, and command over their own policies, the rise in government debt, partly occasioned by the cost of bank bail out, began to threaten their solvency, since the standard remedies for excessive public sector debt, i.e. low interest rates, devaluation and inflation, (and to a lesser extent financial repression) were no longer open to them. At the same time, but for rather different reasons, the debt/GDP ratios and concerns about public sector solvency rose in other peripheral countries, Greece, Cyprus, Portugal and Italy.

Banks are, in almost all countries, ultimately reliant on the background support of their own government. Their liquid assets largely take the form of claims on their own government. In the last resort, recapitalisation will involve government help. So, while weak banks can, and do, exist in countries with financially strong governments, it is much harder to envisage strong banks in countries with financially weak governments. Thus the financial weakness of the governments fed back into a weakening of banks in those same countries. Bank credit expansion then declined even more, thereby weakening those economies, and hence tax receipts further. This was a key feature of the self-amplifying doom-loop, between government and banks, especially in the Eurozone countries, that was meant to be arrested by the move to an EU Banking Union, which will be discussed in the final section of this chapter.

Despite (my claim that) bank recapitalisation, to prevent a financial melt-down, was amongst the best possible uses of public funds, banks became seen not only as too big and expensive to save, but also as too politically unpopular to save.

Such unpopularity derived from two interrelated sources. First, the remuneration, especially the bonuses, of bankers, especially investment bankers, appeared obscenely high relative to ordinary professional salaries. During the 'good' years this could, perhaps[12], be explained, and/or excused, as a return to risk manage-

[12] Why did remuneration in (investment) banking rise so high? A difficult question. My own preferred answer is that such remuneration ultimately depended on the preferences of those in control of banks, i.e. the shareholders. Given the limited liability of such shareholders, they benefited from banks taking on extra risk. The form of the high remuneration was a semi-conscious inducement to bankers to assume more risk.

ment. But when such risk management patently failed, the remuneration (and bonuses) did not seem to decline commensurately. Hence a bank 'bail-out' was widely seen as a transfer from (poorer) taxpayer to (richer) banker, and resented as such.

The second reason for the unpopularity of bank bail-outs was its portrayal as a consequence of bad behaviour by the banks themselves, for which the rest of the economic community had no responsibility and about which they had no knowledge. Thus, it was suggested, banks failed because they took large (proprietary) bets on complex instruments (often at the expense of gullible clients), using High Frequency Trading with unimaginably detailed computer codes, etc., etc. They often also rigged the markets in their own favour (LIBOR). And they did all this on the basis of our deposits, and, if the bet went wrong, on the basis of taxpayer support.

As we all know such bad behaviour certainly was far too prevalent. The list of rogue traders grows longer. Clients have been encouraged to take on financial positions that benefit the intermediary (or its agent) rather than the client. The profit of the intermediary, or its agent/employee, is put before that of the client, at times illegally so (LIBOR again). All this is sadly true.

But (my claim is that) none of this had much to do with the financial crisis. That crisis *was* due to a bet, but a bet that housing prices would continue to rise, or at least not fall sharply. Most members of the economic community were complicit in that, authorities, regulators, economists, the personal sector, the construction industry, as well as the banks. And most sectors, including the public sector, persons, property, (monoline) insurance, as well as banks took on too much debt (high leverage) often in too concentrated a fashion (e.g. AIG, UBS).

In part because of a basic (and sometimes wilful) misinterpretation of the causes of the crisis, and also because the exaggerated salaries in banks mostly went to the investment banking arm of the bank, a dichotomy has developed in the public discourse between the supposedly 'bad' investment (or 'casino') bank and the assumed 'good' retail (or 'utility') bank. The idea is that investment bankers do little but gamble with funds provided to them by the 'little man'. This is, of course, a travesty. This is not the place to describe in any detail what an investment bank does, but its clients are different, i.e. governments, large institutions in the public, private and financial sectors and a few rich individuals, and its work is largely to act as gate-keeper and facilitator to wholesale financial and capital markets for all the large institutions who use such markets.

Be that as it may, the viewpoint that the crisis was, in some large part, caused by the bad behaviour of investment bankers has not only hardened political insistence on limiting the scale of future public sector support, but has also influenced

the way in which that demand should be achieved via structural change and legislation. In particular this has resulted in proposals (e.g. Vickers and Liikanen) to limit such support to certain restricted forms of banking activity, i.e. retail banking, in certain limited geographical areas, i.e. the home country or the EU, where preference for one's own country over other EU members is not allowed. Even within the EU, home authorities are encouraging their own banks to lend primarily in the home country, whereas host countries want to prevent host-country deposits from exceeding local lending. This route leads towards the re-nationalisation and Balkan fragmentation of banking, and a withdrawal from the previous global financial system.

Moreover, although restricting public sector support just to the retail part of banks may satisfy the current political imperative, it is far from clear that it will meet the economic objectives of preventing future contagious financial crisis. Lehman Bros was a pure investment bank. Investment banks are far more interconnected, for example via wholesale financial markets, with other banks, other markets, other financial institutions, etc., than retail banks. There are likely to be more economic externalities consequential on the failure of an investment bank, than of a retail bank. It is arguable that, to avoid economic disruption, investment banks should be supported and saved, whereas retail banks could be more easily closed, with the bad parts liquidated and the good parts transferred elsewhere.

Ring-fencing in some form, à la Vickers and Liikanen, is the leading contender for structural change. There are, however, other versions of this, such as the Volcker rules, though the definitions of what trading activities need to be put in a separate subsidiary, and how one can distinguish trading on one's own account from market-making on behalf of clients, remain fuzzy. There are a wide range of other proposals. Thus if banks are too big to fail, (or alternatively too big to manage effectively), then just make them smaller? But 'big' in relation to what? Must small countries prevent local banks becoming cross-border banks. Must all large cross-border banks be based in the USA, China or Japan? Can the EU only afford large cross-border banks if, and when, a full Banking Union is established? Anyhow, the record of avoiding crises in states where banking was primarily done by many small (unit) banks has not been good (UK before 1850, USA relative to Canada, etc.). Contagious failure is even more common amongst weak, similar, small banks.

One common element amongst banking (financial) failures has been the presence, and extent, of maturity mismatch, whereby depositors, and other creditors, can withdraw funds from the bank before the bank can realise the value of assets, or only at a fire-sale loss. There are several potential measures to lessen the dangers arising from such maturity mismatch. The more extreme forms seek to ban it altogether. Narrow banking, and its more comprehensive version in the Chicago

Plan Revisited (Benes and Kumhof (2012)), seek to abolish maturity mismatch by legislative fiat[13]. In this Plan the private sector can only offer zero-yielding (probably negative yielding, to offset running costs) transactions balances, or much longer-dated interest-bearing debt, (with a duration related to that of the assets), (or mutual-fund type equity). Since many investors seek short-dated, interest bearing assets, they would presumably switch towards Treasury Bills. In part the purpose of the Chicago Plan is, indeed, to shift financing channels (e.g. money creation) back from the private to the public sector.

While such more radical plans have remained largely within the confines of the academic community, the more traditional method of restraining maturity-mismatch risk had been via cash and liquidity ratios. In the previous sections of this chapter, the reasons for the demise of such liquidity requirements in the 1970s and 1980s were spelt out. When it became obvious, after the financial crisis had struck, that adherence to required CARs, i.e. to Basel II, did not guarantee access to continuing wholesale financial markets, attention has turned back to liquidity ratios, notably in the guise of an LCR (Liquidity Coverage Ratio) and an NSFR (Net Stable Funding Ratio).

There are, however, two problems with all such liquidity ratios. The first is that a ratio which has to be maintained at all times, if only out of fear of reputational damage, is almost by definition not usable, and hence not liquid. A liquidity *requirement* is an oxymoron. Our regulators have been slow to recognise this problem or to devise a method that encourages banks to maintain a 'desirable' level of liquid assets in normal times, but to fall temporarily below it when unusual and unforeseen net outflows occur. A pre-arranged ladder of sanctions for liquidity shortfall might be desirable.

The second problem is that the requirement to hold more lower-yielding liquid assets both substitutes for, and raises the required (to meet the bank's objective) spread on, less liquid bank lending to the private sector. So the more severe the proposed LCR/NSFR will be, the greater the cost and the less the efficiency of bank intermediation. Some, for example Willem Buiter, have argued that, since the Central Bank can buy, or lend against, any asset, the whole notion of requiring liquidity ratios is otiose. While in some senses that is true, Central Banks do not like being put in a position of having suddenly to deal with a run caused by maturity mis-match, or equally to replace dysfunctional wholesale financial markets by having to expand their own balance sheet. Thus liquidity ratios can also be seen as protective devices for Central Banks.

Except in some very rare cases when liquidity shortages are caused by operational/administrative problems, e.g. computer malfunction, failures of clearing

[13] See also Chapter 9 in this Volume.

systems, etc., the reason why a bank cannot borrow enough (in wholesale markets) to meet its due debts is because its potential lending counterparties think that there is some probability that they will not get repaid. The estimated PD that would provoke a run of (unsecured) creditors can be small, since the cost of not doing (or not rolling over) the investment is also very small.

So the main protection, both against liquidity shortages, against bank failure and against the need to use taxpayer funds in support, has to be the maintenance of sufficient loss-absorbing bank funds to make default totally improbable. The foremost lesson of the financial crisis was, therefore, that bank capital buffers were too exiguous. The main purpose of Basel III has, as a result, been to reinforce and augment banks' CARs. It has done so in four main ways. The first has been to focus on a narrower and purer definition of equity capital, as the Germans had argued for in the first place back in 1987. The second has been to require considerably higher ratios. The third has been to be much tougher on some risk weightings, notably of assets held in banks' trading books. The fourth has involved getting started in devising a ladder of sanctions as equity capital falls towards the 4½% minimum level in the shape of a 'conservation range' when banks hold between 7% and 4½% of core tangible Tier 1 equity; when in this range constraints are placed on banks' ability to pay out money to shareholders in dividends or buy-backs and in (extra) bonuses to senior staff.

While this is all to the good, many (academic) observers see some remaining, serious flaws. First, despite their manifold flaws, the focus remains on relating capital to risk-weighted assets, rather than to a simpler leverage ratio to total assets. There is now also to be *some* reliance on such a simpler ratio, but only as a backstop with a permissive quantification, 33 to 1. I would rather reverse the emphasis, using the simpler leverage ratio as the main control, perhaps at 20 to 1, but also employing a RWA measure as a back-stop to avoid attempts to get around the control by moving into higher risk/higher yield asset categories.

The second main problem, at least from the banks' viewpoint, is that the proposals for augmenting CARs never seem to come to any final conclusion. Ideas for strengthening CARs, by raising equity ratios, by requiring (high or low trigger) CoCos or contractually bail-inable bonds in addition to the equity, continue relentlessly. The banks face extreme regulatory uncertainty. After a financial crisis of such magnitude this is probably inevitable, and, given the bad odour of some banking behaviour, such complaints will not be treated with much respect. Nevertheless it is quite hard to operate when the framework is in a constant state of flux.

The third, and most important, has been a failure to distinguish clearly enough between the desired equilibrium end state for CARs and the dynamic *process* for moving in that direction. Almost all (financial) economists agree that in the

optimal equilibrium state banks should have a *much* higher equity ratio, perhaps 20% of RWA or 12% of total assets, though many of us would want banks to be able to drop below this (counter-cyclically) at times of pressure, perhaps along a ladder of sanctions. The extra benefit in protection against default, contagion and crisis would outweigh the relatively minor increase (once in equilibrium) in the costs of intermediation. Even if the Modigliani-Miller theorem only holds partially, it can be shown that this remains the case.

The problem lies in getting there. Shareholders own, and ultimately control. They are naturally primarily interested in their own return, the return on equity (RoE). Bank managers know who is boss, and, being given equity bonuses, are also large shareholders. So RoE is the focus of their attention. Raising new equity dilutes RoE, and the benefit largely goes to the other debt holders, especially at times of low market (to book) values and large 'debt overhang'. Bank boards will, therefore, *not* issue more new equity now unless they have absolutely no alternative, so an announced new issue becomes an even worse signal of weakness.

Against this background setting a higher capital adequacy *ratio* will simply enforce delevering of assets. Admittedly beforehand such leverage was excessive, so some delevering may be anyhow desirable. Allowing a lengthy period before such higher ratios need to be attained just slows up the process. Almost all governments are putting pressure on their own headquartered banks not to cut back on credit creation in their own countries. So this process strongly reinforces the reverse fragmentation of banking systems away from a global or regional (European) framework back into the segregated national systems from which they had emerged in the 1970s and 1980s.

The Americans have managed the recapitalisation of their banking system better than the Europeans. What is needed is a 'stress' test to assess the appropriate amount (level) of equity capital, conditional on the total (and risk-weighting) amount of assets at that (stress test) point of time. Then, incentives have to be put in place to induce each bank to raise such new equity, with the necessary proviso that, if equity capital fails to rise enough, the public sector will forcibly inject new equity on terms unfavourable to existing shareholders. The ESM could play such a role, at least to some extent, but whether it would do so has yet to be seen. Beyond that minimum level of equity, limitations on bank pay-outs to shareholders and in bonuses to senior managers could be used both as an incentive and as a means of bringing bank equity up to the desired level.

7.5. WHERE DO WE GO FROM HERE?

From 1945 until the late 1960s/early 1970s financial and banking systems were national in character. Although there were commonly shared ideas, regulation and supervision were undertaken separately in each country. Such segmentation then broke down under the influence of the global euro-dollar market, the abandonment of exchange controls and the development of IT. The separate national systems then transformed into a cross-border, global financial system. Regulation also became, to some extent, global under the aegis of the BCBS, but in truth the BCBS was dominated by the Europeans because of their numerical majority. Enforcement of such regulation and supervision, however, remained strictly national, partly because the BCBS and FSB did not feel constitutionally capable of recommending sanctions for those failing to abide by the proposed regulations. In so far as global supervision was undertaken, it was done by the IMF under their FSAP programme.

Now that global system is under increasing threat. The financial crisis has caused a fragmentation of banking (and to a lesser extent finance) back towards a strong national focus, especially in Europe. It is dubious whether this can, or should, be reversed at the global level. The prior dominance of the BCBS/FSB by the Europeans is disappearing with the rise of Asia. Anyhow the problems in Europe are largely sui generis and specific to the Eurozone, owing to the adoption of a single currency without the associated political and economic infrastructure (and adjustment mechanisms) in place that would allow such a currency system to operate effectively.

There are two main immediate problems. The first is the position and role of the UK. This has become the main financial centre in Europe. But the UK, whilst remaining (unsecurely?) in the EU, is not now, and unlikely in the foreseeable future to become, a member of the Eurozone. The consequence is that there will be continuing differences of approach to regulation and supervision between the 'outs' and the 'ins', which will shift the geographical balance of advantage and cause perennial frictions. If the intention is to move from a national, or more recently a global, to a more European banking and financial system, do we mean European as in Eurozone or as in EU, or some untidy and complex mixture of the two?

The second, and even more acute, problem is how to distribute the burden of meeting the banking losses that have been, and continue, arising as a result of the financial, and on-going, Eurozone crisis. He who pays the piper calls the tune. If the burden of meeting losses continues to fall solely, or primarily, on the nation state in which that bank is headquartered, then the balkanisation of banking back into segmented national silos will continue, and 'Banking Union' will exist in

name only. At the outset of the exercise to establish such a Banking Union, it was widely thought that not only would there be a single supervisory mechanism (SSM) via the ECB, but also that there would be a mechanism put in place, via the ESM, whereby the costs of any necessary recapitalisation would be absorbed at the Eurozone, rather than just at the national level, (plus a common Eurozone based deposit insurance mechanism). Subsequently movement in that direction appears to have gone into reverse. Costs and responsibilities will, it seems, mainly remain national, rather than European (Eurozone). The 'doom-loop' between sovereigns and their banks remains unbroken.

The future of Europe, and of its banking system, remains uncertain and at risk.

REFERENCES

BASEL COMMITTEE ON BANKING SUPERVISION, 1997, "Core Principles for Effective Banking Supervision", September, see www.bis.org/publ/bcbsc102.pdf.

BENES, J. and KUMHOF, M., 2012, "The Chicago Plan Revisited", *International Monetary Fund Working Paper*, WP/12/202, August.

BLUNDEN, G., 1977, "Control and Supervision of the Foreign Operations of Banks", Chapter 13 in WADSWORTH *et al.*, (Eds.), *The Development of Financial Institutions in Europe, 1956-76*, (Leyden, Netherlands: A.W. Sijthoff).

BRIMMER, A.F. and DAHL, F.R., 1975, "Internationalization of Commercial Banking – Growth of American International Banking – Implications for Public Policy", *Journal of Finance*, 30, 341-363.

DALE, R., 1984, *The Regulation of International Banking*, Cambridge, UK: Woodhead-Faulkner Ltd.

FINANCIAL MARKETS GROUP, 2001, "An Academic Response to Basel II", *Financial Markets Group Special Paper* No. 130, May.

GOODHART, C.A.E., 2011, *The Basel Committee on Banking Supervision: A History of the Early Years, 1974-1997*, Cambridge, UK: Cambridge University Press.

INTERNATIONAL MONETARY FUND, 2000, "Selected Decisions of the International Monetary Fund", 25th Edition, Washington DC: International Monetary Fund.

JOHNSTON, R.B., 1982, *The Economics of the Euro-Market: History, Theory and Policy*, London: Macmillan.

JORDA, O., SCHULARICK, M. and TAYLOR, A.M., 2012, "When Credit Bites Back: Leverage, Business Cycles, and Crises", *Federal Reserve Bank of San Francisco Working Paper* 2011-27.

LASTRA, R., 2006, *Legal Foundations of International Monetary Stability*, Oxford University Press.

LEWIS, M., 2011, *The Big Short: Inside the Doomsday Machine*, Penguin.

MARKOWITZ, H.M., 1952, "Portfolio Selection", *The Journal of Finance*, 7(1), pp. 77-91.

SCHULARICK, M. and TAYLOR, A.M., 2009, "Credit Booms Gone Bust: Monetary Policy, Leverage Cycles and Financial Crises, 1870-2008", *NBER Working Paper* No. 15512, November.

THE ECONOMIST, 1974, "A World Banking Crisis?", 3 August, 55-57.

TURNER, A., 2010, "What do Banks Do? Why Do Credit Booms and Busts Occur? What Can Public Policy Do About it?", Chapter 1 in *The Future of Finance: The LSE Report*, by TURNER, A. *et al.*, London UK: London School of Economics and Political Science.

8. The Evolution of Financial Supervision: the Continuing Search for the Holy Grail

Donato Masciandaro and Marc Quintyn[1]

> "…the conduct of supervision is a thankless task which is all too likely to tarnish the reputation of the supervisor … The best that a supervisor can expect is that nothing untoward happens. A supervisor is only noticed when either he/she angers the regulated by some restrictive or intrusive action, or when supervision "fails" in the sense that a financial institution collapses or a customer gets ripped-off. One can talk oneself blue in the face about the desirability of allowing some freedom for banks or other financial institutions to fail, etc… but supervisors will always tend to get a bad press when that does happen, come what may."
>
> (C. Goodhart (2000), p. 28)

8.1. Introduction

Financial regulation and supervision (or "regulators" and "supervisors") are terms that are often used interchangeably. Yet, they reflect separate activities and are typically performed by different people, even though they are (by necessity) complementary in their contribution to the final objective which is to maintain a sound financial system. While *regulation* concerns the drafting and implementation of rules and regulations governing the activities of the financial system, supervision is about ensuring that financial institutions obey the regulatory framework, and imposing sanctions on those institutions that do not abide by the rules and regulations. Such sanctions can go as far as "closing" insolvent institutions, with attendant consequences on individuals' property rights.

This chapter presents an overview of the evolution of financial supervision. Supervision, as we know it now, emerged as an autonomous policy area between the mid-to-late seventies and the early eighties of last century and grew to maturity during the eighties and nineties. During the seventies, several advanced economies had begun the move from strategies of financial repression, to financial liberalization (or deregulation) – first domestically and gradually also internationally. The newly emerging environment led to a dissociation of fiscal policy,

[1] The views expressed in this chapter are those of the authors and do not necessarily represent those of the IMF or IMF policy. The authors would like to thank the referees for very constructive and useful comments and suggestions.

monetary policy and financial regulation and supervision. While these policy areas were intensely intertwined in the first two post-war decennia, they now started to emerge as independent (but also interdependent) policy areas. In the late eighties and early nineties, emerging and developing economies got also engaged in this liberalization process.

In this new environment, the need for a coherent financial regulation and supervision framework was in fact spurred by the first banking (or financial) crises – such as the secondary or "fringe" bank crisis in the UK (1973-75) and the Herstatt failure (1974), later followed by crises in several Latin American countries. Once the need for a supervisory system was recognized, academic interest in the topic emerged as well. From here onward the debate about, and the evolution of, financial supervision has been evolving along a number of themes related to its *efficiency* and *effectiveness*. The first debate focused on the relationship between monetary policy and supervision, once two intertwined and now two separate policy domains. The key question was whether central banks should perform both activities, or whether these policies should be separated institutionally.

While the foregoing debate was exclusively on banking supervision – *prudential* supervision of other financial activities such as securities, insurance and pensions funds was nearly nonexistent in the first decades – the gradual blurring of the boundaries among financial institutions' activities led to a new debate in the mid-1990s. The question was whether supervision of banks and other types of financial institutions should be conducted under one roof (one single agency) in order to enhance efficiency and effectiveness.

A third area of discussion – the governance of supervision – emerged in two steps. In the wake of the Savings and Loans (S&L) crisis in the United States in the latter part of the 1980s, prominent scholars pointed at weaknesses in supervisory governance (without, however, using that term). More specifically, self-interest capture was mentioned as a key contributor to this crisis. It was, however, the East Asian financial crisis (1997-98) that led to a more fundamental debate about supervisory governance because scholars and practitioners alike had pointed at the fact that the string of national crises was, among others, provoked by the fact that many supervisors had been operating too close to – and under pressure of – their governments.

Then came the global crisis[2]. This crisis led to the full development of macro-prudential supervision as a new policy domain next to the traditional, and henceforth called, micro-prudential supervision. The institutional organization of both, naturally, has a bearing on all of the previous themes. So, all the themes

[2] Chapter 12 in this volume by Ayuso and Blanco deals specifically with financial crises.

mentioned above are back at the discussion tables, both at the national and the international levels.

So, here we are, into the fourth decade of evolution in our thinking about, and fixing of, supervision. While it seems that the literature has identified and discussed all the essential themes that have an impact on supervisory efficiency and effectiveness, there is also a widespread feeling that the search, and research, remains unaccomplished. Indeed, none of the discussions on the various themes has come up with clear black-and-white conclusions, and each of the issues is being reopened after every financial crisis Post-mortems of each and every financial crisis point (rightly or wrongly) at supervisory failures and the cry for change resonates loudly.

Why is this the case? And is it typical for financial supervision? This chapter will explore these questions. The answers come from two angles, which also reinforce each other. On the one hand, in a liberalized financial system, the search for supervisory effectiveness is eternally caught by the tension that exists between the need for control of financial systems and the latter's aspiration to operate as freely as possible. In this environment, supervision is supposed to *monitor* (and sanction if needed) the financial system, more than strictly *control* it. This means that supervision's essential mission is "to bring about an appropriate governance for banks" (Dewatripont and Tirole's (1994) "representation hypothesis" of regulation and supervision.) Even though the objective of regulation and supervision is to ensure the soundness of the financial system, the implication of the representation hypothesis is that the *ultimate* responsibility for financial soundness remains with the financial institutions themselves (and their corporate governance) and not with the supervisors. The upshot of this tension – and the concomitant challenge for supervisors – is perfectly reflected in Goodhart's quote at the beginning of this chapter: if financial institutions are free, failing is part of this freedom, but supervisors will always be blamed for it.

On the other hand, since the objective of soundness of the financial system remains hard to define and is certainly not strictly measurable, supervisors and their principals have, from day one of financial deregulation onward, been struggling with agency problems. Supervisors' contract (in a principal-agent sense) will always be incomplete because of the definition and measurement problems with their objective and the multiple contingencies that they are facing in executing their jobs.

Both explanations are at the source of an important "gap between the expectations of the public (*and often the politicians – our addition*) about the roles of (banking) supervision (that no one should ever lose any part of their deposit as a result of a (bank) failure), and the objective of the supervisors (i.e. to prevent systemic collapse and the alleviate asymmetric information by the partial protec-

tion of uninformed clients." (Goodhart and Schoenmaker (1995a), p. 342). This discrepancy leads, as Goodhart and Schoenmaker (*ibid.* p. 343) state, to the well-known recurring situation where "…the public and politicians will blame the regulatory authority for the crises that do occur ….while taking the regulators for granted otherwise." To a large extent, this blame game is at the origin of the ever recurring efforts to revisit the various aspects of supervision by the political class.

The truth is that both perspectives should lead us to understand that supervision can never (and, in Corrigan's (1992) words should never) be failsafe. This rather disconcerting finding should not be a reason to give up the search for more efficient and effective supervision. After all, supervision is the vital link between regulation and financial sector stability. Even the most effective regulatory framework (if such a thing would ever exist) would not succeed, if it is not carried through by effective supervision. In addition, financial supervisors have powers that go far beyond the typical powers of most other regulators. Their enforcement and sanctioning powers potentially have a far reaching impact on individual rights, particularly the right to property, as in the case of the closure of a bank. For these two crucial reasons, the profession should remain focused on the main supervisory questions of our times, draw lessons from crises and try to improve its efficiency and effectiveness. In the last section of this paper, we propose a new architecture that could lead to better supervisory governance, and thus improved effectiveness.

This chapter will review the evolution of supervision from the angle of the key moments that defined and colored it. The next section presents an overview of the evolution of financial supervision. The subsequent sections discuss in detail the various individual steps in the evolution. They deal with the architecture of supervision, the role of the central bank, the governance of supervision, and the new twists in the ongoing debate in the wake of the global financial crisis, from which our proposal follows.

8.2. EVOLUTION OF FINANCIAL SUPERVISION – A TIMELINE

Financial supervision, as we know and define it now, has emerged less than four decades ago. Since then, it has come a long way, but the conclusions summarized above are telling us that it still has some way to go to be the effective link between the regulatory framework and the objective of financial sector soundness and stability. This section lays out the evolution of financial supervision by identifying the major milestones since its emergence as an autonomous policy field. Our presentation will follow Table 8.1, which presents these milestones, in conjunction with their main drivers and developments in other macroeconomic policy fields of relevance for developments in shaping financial supervision.

8.2.1. Emergence as an Autonomous Policy Area

Bank supervision emerged as an autonomous policy field in the wake of financial liberalization which started to gain ground in most advanced economies in the late-1970s. Before that time, and since the end of the Second World War, economies were dominated by what McKinnon (1973) and Shaw (1973) labeled as financial repression. Financial repression was an essential part of a government strategy that aimed at rebuilding war-torn economies and fostering economic growth and development through a centralized control over the financial system. Key features of this strategy were a predominance of state-owned banks, the use of such instruments as credit ceilings, directed lending, interest rate controls and high reserve requirements for commercial banks, and monetary financing of government deficits by the central banks – who were typically under the strict control of the government. More generally, the activities of commercial banks were strictly regulated.

Table 8.1: Milestones in the Evolution of Financial Supervision

	Drivers	Financial Supervision	Financial Regulation	Monetary Policy	Financial Stability
1950s and 1960s	"financial repression" is dominant model	Monetary policy, bank regulation and supervision, and fiscal policy are all intertwined and the former two are subordinate to fiscal policy. Credit controls, credit ceilings, interest rate controls serve multiple purposes, these instruments are implemented by the central bank, which is tightly controlled by the government.			
1970s	Starting mid-1970s: domestic financial liberalization, mainly in advanced countries				
	1973-75 Fringe bank crisis (UK) – 1973 Franklin National Failure (US) – 1974 Herstatt Failure	Recognition of prudential banking supervision as a stand-alone financial policy area	Emergence of "prudential regulation and supervision" (in addition to legal control).	Move from direct to indirect instruments – development of financial markets – convergence onto notion of "*price stability*" as single objective of monetary policy	
			1974 – Basel Committee on Banking Supervision (BCBS)		
1980s	1981 Banco Ambrosiano				
	Gradual international financial liberalization leading to internationalization of big financial institutions		1988 Basel Concordat – first attempt to harmonize key prudential regulations in order to create level playing field among internationally active banking institutions. Focus is on capital as anchor for prudential regulations.	Central bank independence is being promoted as the institutional device to avoid time inconsistency in monetary policy and achieve the price stability objective	
	financial crises in Latin America				
1990s	1991 BCCI Failure – 1995 Barings failure	Supervision inside or outside central bank? Relationship with monetary policy			

	Drivers	Financial Supervision	Financial Regulation	Monetary Policy	Financial Stability
		1996 Basel Core Principles for Effective Banking Supervision (followed by similar principles for other segments) – core principles have a bearing on effective supervision as well as effective regulation.			
	Continued blurring of borders between activities of several types of financial institutions. Formation of big financial conglomerates.				
		Supervisory architecture debate starts (unification? Inside versus outside central bank?). Trigger is establishment of FSA in the UK (1997)		Inflation targeting becoming the dominant monetary policy strategy in advanced economies, with growing emphasis on accountability and transparency (central bank governance)	
	1997 East Asian Crisis, followed by Russia (1998) and others		Start work on Basel II		Recognition of importance of financial stability as an independent policy goal
2000s	Great moderation				
		Discussion about supervisory governance, inspired by debate on central bank governance			Several central banks establish "Financial Stability Departments." However, there is no generally agreed and measurable objective and central banks have no clearly defined set of instruments to pursue financial stability
	2007 – start of global financial crisis followed by sovereign debt crisis				

	Drivers	Financial Supervision	Financial Regulation	Monetary Policy	Financial Stability
2010s		Lessons from the crisis include definitive split between micro- and macro-prudential supervision – this leads to the reopening of the debate on supervisory architecture and governance including the role of the central bank.	Basel III	As the result of the crisis, questions are being raised about appropriateness of inflation targeting and unique focus on price stability by central banks	Financial stability accepted as second central bank objective, in addition to price stability – gives rise to recognition of macro-prudential supervision as key policy domain. Instruments are being defined.

While all advanced countries shared the basic philosophy of this strategy, the application of the instruments varied. The United States for instance, used interest rate controls but never applied credit ceilings to their commercial banks. In Germany, the Bundesbank had, for that time, an exceptionally great degree of autonomy and a clear mandate to control inflation, while still using some of those direct instruments.

Under this all-encompassing government strategy, all macroeconomic policy domains were narrowly intertwined. Monetary policy was de facto subservient to fiscal policy and had no clear objectives of its own. Central banks, as an arm of the government, were key instruments for quasi-fiscal activities. As economic entities, commercial banks were subject to a set of strict regulations governing their activities. Many among them were state-owned banks. What is known now as "prudential regulations" was non-existent[3]. In theory, monetary controls served indirectly as prudential controls (Hall (1993)) as they put limits on the commercial banks' activities. However, the reality in most countries was different: credit controls, directed lending and subsidized interest rates served the politically well-connected and gradually led to a culture of non-repayment of loans and corruption, thereby eroding the banks' capital and forcing the governments to recapitalize them. If there was some form of "supervision" it was limited to a "box checking"-activity.

In the end, the strategy behind financial repression did not yield the expected results in terms of growth and development – and in addition, increasingly produced negative side effects as discussed above. Leading authors, such as McKinnon (1973) and Shaw (1973) argued in favor of letting the financial system play its role more freely in order to arrive at a better allocation of scarce financial resources. With the Anglo-Saxon world in the lead, several countries embraced financial liberalization (or deregulation), first domestically and gradually also by opening their borders.

The new paradigm – financial liberalization – implied that financial institutions would compete for resources and in their allocation process. And competition means taking risks – finance in general is about taking risks. Against this background the concept of "prudential regulation and supervision" came into existence. In fact, just like many subsequent episodes in the evolution of financial regulation and supervision, the recognition of the need for a prudential regulatory and supervisory framework was crisis-driven. In several countries, financial liberalization soon became associated with financial crisis (as epitomized in the

[3] Since the mid-1930s, the US had some form of bank supervision, but it consisted in essence of a set of strict bureaucratic controls over the banks' activities (Lacoue-Labarthe, 2003). The UK had a system of self-regulation for commercial banks (Goodhart, 2007), but this system was rather cartel-protecting and enforcing and did not serve prudential purposes.

early liberalization literature by Diaz-Alejandro's (1985) "Good-bye Financial Repression, Hello Financial Crash" who observed that in the case of Latin America, liberalization in many cases led to financial crises and that lax prudential supervision in a liberalized environment contributed to these outcomes). Thus, the need for a prudential regulatory framework became pressing because of growing evidence that financial institutions' internal risk management and governance were not strong enough – or did not get the attention needed – to control, or avoid, negative externalities.

Literature has justified government regulation in three types of situations: (i) to curb monopoly power; (ii) to protect investors (or consumers): and (iii) to preserve systemic stability. Reasons two and three have commonly been put forward to justify more stringent regulations for the financial sector, than for any other sector in the economy. In fact, under financial repression, financial institutions merely operated, and were regulated, like other utilities companies, whereas in a "liberalized" world, the financial system was elevated to a key role in the economy. So, systemic stability became a major concern, justifying a new set of regulations, prudential in nature. The Cooke Committee was the first attempt to formulate a harmonized set of "prudential regulations" supposed to guide the banking business[4].

The need for an elaborate supervisory framework (again, much more elaborate than for other economic sectors) stems from two reasons. First, the 'public good'-role of the financial system, as the fulcrum of the economy, justified that the prudential regulation framework be complemented by an intrusive supervisory framework (consisting of "off-site monitoring" and "on-site supervision"). Secondly, there was a growing consensus that banks were "special." They are special, not only because they are pivotal in the economy, but also because growing risk-taking in an increasingly competitive environment led to a growing opaqueness of their balance sheets. The opaqueness is a big barrier for an important group of stakeholders, the (small) depositors who had an increasingly hard time to get accessible information about the state of their financial institution. So supervision in protection of this group of stakeholders was justified. Supervisors were entitled to participate in, and have a say about, the governance of the individual financial institutions, such as their risk management (Dewatripont and Tirole (1994)).

Once "prudential regulation" and "prudential supervision" had been established as autonomous policy areas, academic interest in the topics started to grow, as

[4] The "Basel Committee on Banking Regulation and Supervisory Practices" saw the light of day in 1974. The First Basel Concordat was agreed in response to the failures of Franklin National and Herstatt. Subsequent failures, and the fact that growing international competition was driving down bank capital ratios led to the 1988 Basel Accord, a first set of harmonized prudential rules (Goodhart, 2007).

was recognized by Richard Schmalensee in the foreword to Ed Kane's 1985 book on deposit insurance and supervision:

> "Until quite recently this regulation (of financial services) has not received scholarly attention commensurate with its economic importance; it seemed to fall into a large crack, separating students of regulation, whose background rarely equipped them to analyze financial markets, and students of finance, who were not generally much interested in regulation and its effects."

In effect, Kane's book, together with a few other publications in the mid-1980s, was among the first ones to offer an economic perspective on prudential regulation and supervision[5]. To confirm the above observation, and give an indication of the growing interest since then, we conducted a (non-exhaustive) search of the economics literature on the terms "bank supervision" and "financial supervision"[6]. In the period 1970-79, two papers were published that had "bank supervision" in the title or the abstract (Figure 8.1)[7]. For the 1980s, the number was four. It increased exponentially to 21 in the 1990s and 71 in the period since 2000. Supervision of other parts of the financial system was largely irrelevant for research until the 1990s. The first papers with "financial supervision" in title or abstract appeared after 1990 (five for the decade, which are included in the 21 above), and 61 in the period since 2000, meaning the larger part of the 71 publications referred to above.

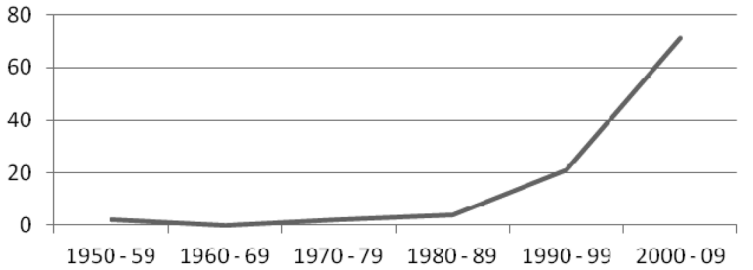
Results of a search into the broader category of news articles (as an indication of the broader public's interest in the topic) with both terms in the headline or the lead paragraph are reflected in Figure 8.2. Bank supervision appeared only once or a few times in the seventies and early eighties. Around the time of the Savings and Loans crisis (S&L) in the US we notice a first peak. The next peak is at the time of the Asian crisis, when also "financial supervision" makes its appearance. Since the early 2000s, the latter overshadowed the former significantly, and the global crisis led – as could be expected – to an explosion of references to financial supervision. Thus, besides the increase in general interest in the topics in the broader news, it is also clear – but not surprising – that the interest in the topic is highly crisis-driven.

[5] See also Gardener, (1986) on the UK, and Benston, Eisenbeis, Horvitz, Kane and Kaufman, (1986) on the US. Hall (1993) offers an analysis of UK bank supervision in a historical perspective.

[6] We searched with the help of Econlit. Books and book chapters are not included in this search.

[7] We found two references in the 1950s but those were analyses of supervision in the intrawar period. No references were found in the 1960s.

Figure 8.1: Number of Papers on Supervision in Journals (per decade)



Source: EconLit

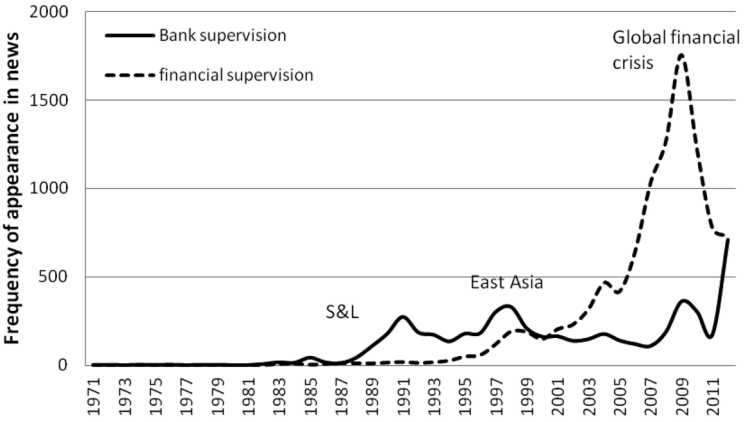
8.2.2. Milestones and their Drivers

Once the economic profession had recognized the importance of supervision, the thinking about its position vis-à-vis other policy areas, as well as its own efficiency and effectiveness started to take shape.

The first topic that attracted a broad audience was the question as to whether supervisors should be housed in the central bank, or more broadly about the relationship between supervision and monetary policy. The seminal paper by Goodhart and Schoenmaker (1995a) set out arguments in favor and against separation. It was followed by a number of other contributions that shed some additional light on the topic. The question emerged from a number of drivers: first, with monetary policy and central banks becoming more independent from governments, and supervision becoming a separate activity, the question was justified as to whether central banks should be (or remain) in charge of supervision. Historically both models had emerged, as Goodhart (2007) stated, in most cases not by design. Secondly, a number of "accidents" in banking (most notably BCCI in 1991) had threatened to tarnish reputations of central banks that were in charge of supervision. Thirdly, the first signs of blurring of boundaries between financial institutions had become visible, opening the debate as to whether central banks should also be in charge of supervising those financial institutions with which they had no direct dealings.

This last driver, an outcome of growing international financial integration and the formation of large financial conglomerates, brought a new topic to the table in the second half of the 1990s, namely the supervisory architecture. Other segments of the financial system were gradually growing out of the shadow of the banking industry and the traditional boundaries among the operations of financial institutions started to become blurred. With this development, prudential supervision of these other segments of the financial system (securities markets, insurance companies and pension funds) had taken shape and the question that

Figure 8.2: Frequency of Appearance in News



Source: EconLit

emerged was whether supervision should remain organized according the traditional silos model (one supervisor for each segment of the financial system), or whether supervisors should be brought together under one roof (integration or unification) in order to enhance supervisory efficiency and effectiveness. Another model that was put at the table (Taylor (1995 and 1996)) was the organization of supervision along functional lines: the twin peaks model proposed a separation between conduct of business supervision and prudential supervision. The role of the central bank remained of course intertwined with this search for an appropriate financial architecture.

The next theme that entered the spotlight was *supervisory governance*. A first discussion of some aspects thereof emerged at the time of the S&L crisis. Several authors, such as Kane (1989) and Randall (1993) argued that supervisory forbearance was one of the main contributing factors to the S&L crisis. Supervisory forbearance implies that supervisors refrain from addressing an institution's problems head on, which is bound to lead to a deepening of the problems in that specific institution, and ultimately to an increase in the costs of addressing them, among others because these problems could be contagious. Thus, forbearance revealed a fundamental commitment problem on the part of supervisors, analogous to the time consistency problem confronted in monetary policy. Hence, supervisory governance arrangements that align their incentives are needed. In an influential paper, Benston and Kaufman (1988) proposed "prompt corrective actions" as an instrument to align supervisors' incentives. This proposal introduced the "rules versus discretion" debate in the supervisory discussion.

The systemic banking crises that hit a number of countries in the period between, broadly, 1994 and 2003 led to a more fundamental and wider debate about

supervisory governance[8]. Lack of supervisory independence was often mentioned as one of the contributing factors to these crises. Finally, the debate also received attention in its connection with the searches for a new supervisory architecture: countries where supervision was taken out of the central bank, wondered if supervisors should enjoy similar levels of independence to what they had in the central bank. In other cases, governments moved supervision into the central bank to ensure that its level of independence matches that of the central bank. Those were also the glory days of central bank independence, which led to demonstration effects.

The most striking feature of the impact of the *global financial crisis* on the supervisory debate is that it has put all the previous themes back on the table, colored by one additional new important trend: the separation of macro-prudential and micro-prudential supervision. This paradigm shift has an impact on all the issues discussed before: the role of the central bank in supervision, the institutional structure of supervision in light of the emergence of macro-prudential supervision as an independent policy area, and the governance of both sides of supervision. The answers to all these questions are still under debate and given the newness of the debate, will certainly go on for a while.

The next sections will go deeper into each of these four themes, highlighting the main issues in the respective debates and indicating the trends. For the smooth flow of the arguments, we will start with the debate on the architecture of supervision, and not with the debate on the role of the central bank (which came chronologically first), because this argument is also embedded in the discussion on the architecture (and both debates emerged within a few years from each other).

8.3. THE ARCHITECTURE OF FINANCIAL SUPERVISION

The discussion about the most appropriate supervisory architecture started in earnest with the 1997 decision of the UK government to move bank supervision out of the Bank of England and into the Financial Services Authority (FSA), a new agency in charge of conducting supervision over all segments of the financial markets. As a matter of fact, this decision was preceded by earlier changes in the supervisory architecture in the Scandinavian countries. In the wake of the "Scandinavian crisis" – often labeled the first systemic financial crisis – the respective governments decided to integrate their supervisory agencies at the national level. One of the arguments used was that their financial sectors were too small to

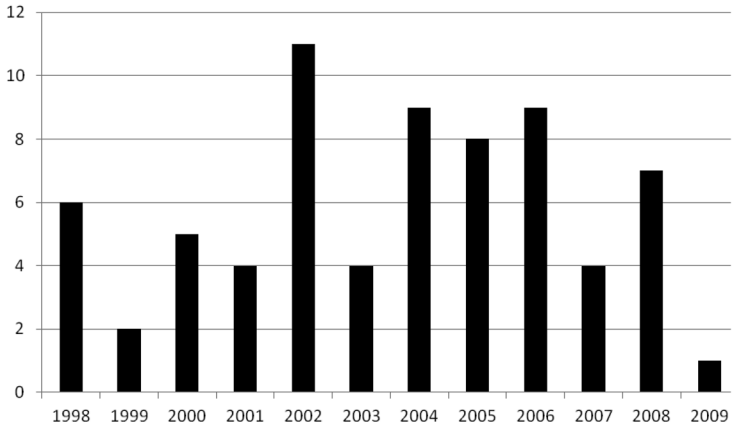
[8] It should be noted that the first version of the Basel Core Principles for Effective Banking Supervision, issued in 1997 just ahead of the Asian Crisis, mentioned (Principle 1) that supervisors should have a fair degree of "operational independence" (Basel Committee on Banking Supervision, 1997).

justify separate supervisory agencies ("small economy argument" – see Abrams and Taylor (2000)).

However, it was the UK decision that actually stirred the debate worldwide, and the consecutive systemic crises of the late 1990s and early 2000s added to the reform zeal. Based on a dataset of a heterogeneous sample of 102 countries, we observe that in the decade before the Global Crisis a large number of countries reformed the structure of their financial supervision. In the ten years since 1998, 64 percent of the countries included in our sample – 66 out of 102 – chose to reform their financial supervisory structure (Figure 8.3), by establishing a new supervisory authority and/or changing the powers of at least one of the already existing agencies.

The reform trend is even more evident when we add a regional and country-income perspective. Figure 8.4 provides a breakdown by country groups and shows that the European, the EU and OECD countries account for respectively 82 percent, 77 percent and 73 percent of the countries that have undertaken reforms. Therefore, the shape of the supervisory regime seems to have been a relevant issue in particular in more advanced countries, and particularly in Europe.

Figure 8.3: Number of Reforms of the Supervisory Architectures per Year (1998-2008)

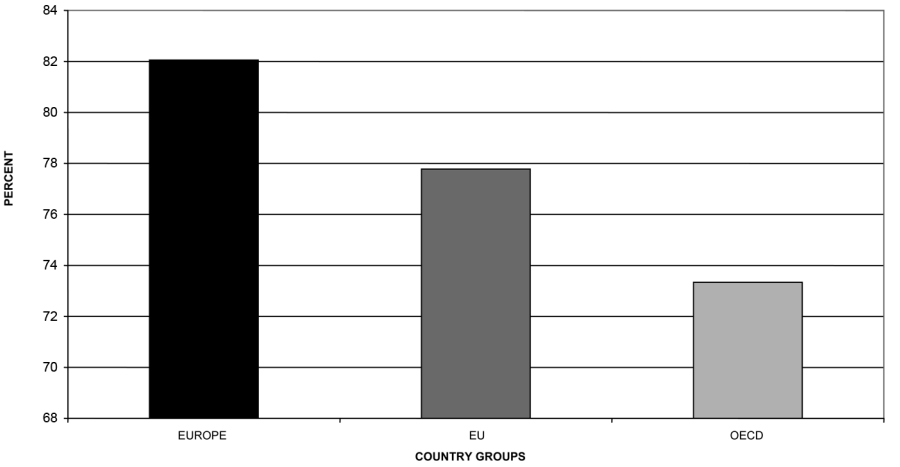


Source: Masciandaro and Quintyn (2009)

Europe was clearly the laboratory of this new consolidation trend in the supervisory architectures. In addition to Norway – the first country to establish a single supervisor in 1986 – and Iceland (1988), five other countries, members of the EU – Austria, Denmark (1988), Germany (2002), Sweden (1991) and United Kingdom (1997) – assigned the task of supervising the entire financial system to a single authority different from the central bank, while in Ireland (2003) the super-

visory responsibilities were concentrated in the central bank's hands. Also, four countries involved in the 2004 EU enlargement process – Estonia (1999), Latvia (1998), Malta (2002) and Hungary (2000) – reformed their structures, concentrating all the powers in a single authority. Outside Europe the unified agency was established, among others, in Korea (1997) and Japan (2001).

Figure 8.4: Reforms of the Supervisory Architectures by Country-groups (1998-2008, % of the total)



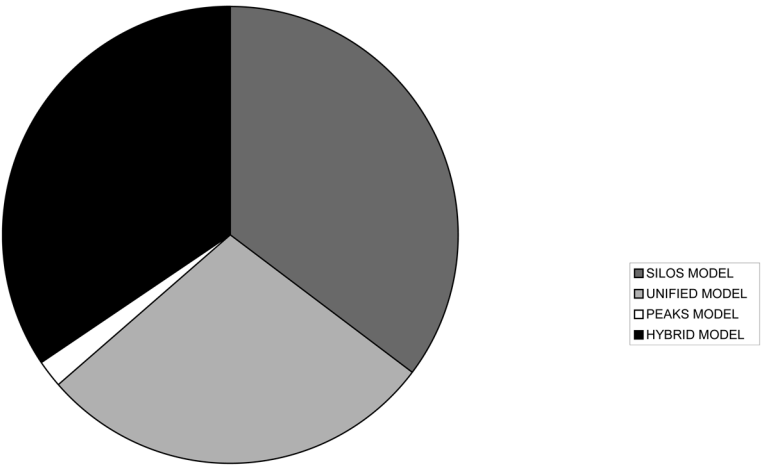
Source: Masciandaro and Quintyn (2009).

Figure 8.5 summarizes the state of affairs at the eve of the global crisis. We group the supervisory regimes along the three main models that theory so far proposed: the vertical (silos) model, which follows the boundaries of the financial system in different sectors of business, and where every sector is supervised by a different agency; the horizontal (peaks) model, which follows the differences among the public objectives of regulation, and where every objective is supervised by a different authority; and the unified (integrated) model, where a single authority supervises all objectives for the entire financial system. We do not consider the model by function, which follows the functions performed by banking and financial firms, given its very limited historical use.

In 36 countries (35 percent of our sample) the supervisory regime still followed the vertical model, with separate agencies for banking, securities, and insurance supervision. The classic silos model worked well in a structure of the financial industry with a clear demarcation between banking, security markets and insurance companies. In the regimes consistent with this model a monopolist agency operates in each sector.

In another 24 percent of our sample (24 countries), a new regime of supervision was established with the introduction of a single authority, covering banking, securities and insurance markets supervision. The single supervisor acts as a monopolistic agency on the overall financial system. In the small 'peaks' group we classify the two countries – Australia and the Netherlands, two percent of our sample – where supervision aimed at preserving systemic stability is concentrated in one peak, and the conduct of business supervision in another. Both the unified model and the peaks model represent examples of the consolidation process that seems to dominate the reforms of the supervisory architectures before the Global Crisis.

Figure 8.5: Models of Financial Supervision Architectures (102 countries)



Source: Masciandaro and Quintyn (2009)

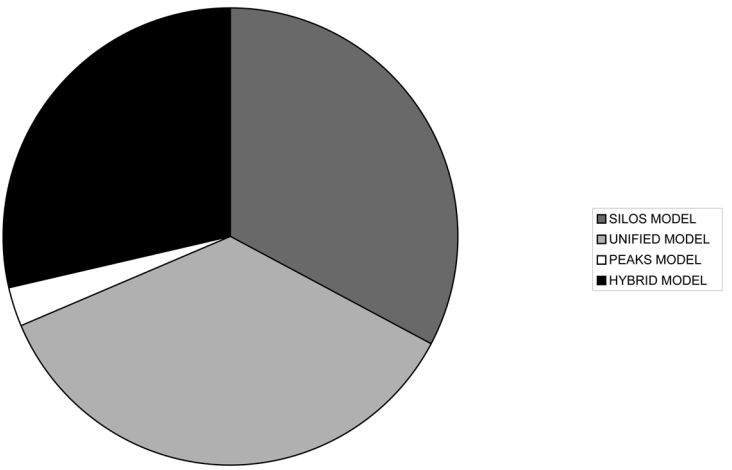
Finally, other countries adopted hybrid supervisory regimes, with some supervisors monitoring more than one segment of the market and others only one. We bring them all together in a residual class (40 countries, 39 percent of our sample). The group comprises countries such as France, Italy and the US. The dimension of the residual class is unsurprising if we recognize that the drivers of each national supervisory setting can be more than one, which are often intertwined and hidden in their historical patterns.

The evolution in the supervisory regimes becomes clearer if we focus on the 66 countries that implemented reforms in the period 1988-2008 (Figure 8.6): the weights of the three main regimes (unified, silos and hybrid) become essentially equal – respectively 30 percent, 33 percent and 33 percent – while the peaks regime is the least common one (four per cent). In other words, 40 percent of the sample (20 countries) adopted an 'innovative' regime of supervision – unified or

peaks regime – while the remaining 60 percent (31 countries) opted for a 'conservative' approach, i.e., maintaining the more traditional regime (silos or hybrid regime).

From a theoretical point of view, the alternative between the single authority (integrated or unified) model and the multi-authority model became the more relevant one in the debate on the supervisory architecture. Identifying the optimal supervisory regime between the two models is a truly interesting problem. *Prima facie*, the single supervisor model seems to be the "natural" and best answer to the challenges posed by the financial market blurring[9]. If, in the long run, the expected financial structure is a perfectly integrated and unique market, the best design for the supervisory architecture would seem to be the single authority[10]. But the answer seems to be not so simple. One strand of literature[11] pointed out that, given different institutional settings, it was possible to highlight the corresponding gains and losses[12], and to perform a rational cost-benefit analysis to choose between alternative models[13].

Figure 8.6: Models of Financial Supervision Regimes after the Reforms Implemented before the Global Crisis (66 countries)



Source: Masciandaro and Quintyn (2009)

[9] See De Luna Martinez and Rose (2001). The importance of financial conglomerates in explaining the supervisory architecture reforms before the Crisis is claimed in Abrams and Taylor (2002), Grünbichler and Darlap (2003), Schoenmaker (2003).

[10] See Lanoo (2000) and Briault (1999).

[11] See explicitly Hawkesby (2000), but most of the quoted studies seem to be consistent with the cost-benefit approach.

[12] For a complete analysis on the arguments in favor of and against integrated supervision see De Luna Martinez and Rose (2001).

[13] In the specific banking regulation area, Kahn and Santos (2001), provide a theoretical analysis of several alternative institutional allocations of regulations.

If it is possible to agree with the initial intuition – the importance of the cost-benefit analysis[14] – it is also worth noting that the relative conclusion on the possibility to find an optimal supervisory regime seem to be rather unsatisfactory and inconclusive. First, one can say that, given a single authority, it is possible to increase the efficiency in the relationship between supervisor and regulated firms, because the cost of supervision and the possibility of supervisory arbitrage decrease[15]. But one can also say that, given the single supervisor model, efficiency in the supervisor-regulated firm relationships decreases because, with a single authority, capture risks could increase[16], while the innovation-incentive in the regulated industry could decrease[17]. Therefore, the sign and the magnitude of the single supervisor model effects, with respect to the regulated firm relationship issues, seem rather vague and ambiguous.

The same kind of conclusion is reached by analysing the relationship between the single authority and the political system (independence and accountability[18], discretionary[19] or capture[20]?), the effects in terms of supervisory organization and resource allocation (economies[21] or diseconomies of scale[22], benefits or costs of goal conflicts' internalization[23]?), and the consequences on the financial services costumers behaviour (confidence[24] or over-confidence[25]?). At the end of the day the consensus was that a "superior" model of supervision cannot be identified.

Empirical analysis confirms these insights: the evidence gathered before the Global Crisis on the impact of institutional features on enhancing supervisory effectiveness remained ambiguous. Barth *et al.* (2003) used a difference of means test to ascertain whether differences in the supervisory architecture correlate in a significant way with key differences in banking industry structure. For a sample of 133 countries, for the period 1996-1999, they found no correlation between the number of supervisory authorities and any of the key features of a banking system. Consolidation does not matter.

---

14 The pros and cons of the integrated model are analysed in Barth, Nolle, Phumiwasana and Yago (2002), Kremers, Schoenmaker and Wierts (2003).

15 Briault (1999), Llewellyn (1999b), Goodhart (2002).

16 Taylor (1995).

17 Barth, Nolle, Phumiwasana and Yago (2002).

18 Briault (1999), Llewellyn (1999b), Lannoo (2000), Abrams and Taylor (2000). On the meaning of regulatory and supervisory independence see Quintyn and Taylor (2002). Beck, Demirgüç-Kunt and Levine (2003) examine the impact of bank supervision independence on the corporate financing obstacles.

19 Goodhart *et al.* (1998). See also Laslett and Taylor (1998), Quintyn and Taylor (2002). On the risks of excessive power of a single regulator see also Taylor (1995), Briault (1999), Llewellyn (1999b).

20 Fender and Von Hagen (1998), Ciocca (2001).

21 Briault (1999) and (2002), Llewellyn (1999b), Lannoo (2000). Abrams and Taylor (2001) and Goodhart (2002) claim that the economies of scale argument is most applicable in small countries or those with small financial systems. Abrams and Taylor (2001) argue that the shortage of supervisory resources is a serious problem particularly in emerging market economies.
Goodhart *et al.* (1998).

22 Goodhart *et al.* (1998).

23 Briault (1999), Llewellyn (1999b), Lannoo (2000), Wall and Eisenbeis (2000).

24 Llewellyn (1999b).

25 Lannoo (2000).

Čihák and Podpiera (2007) suggested that the unified regime is associated with higher quality and consistency of supervision across supervised institutions, measured by the degree of compliance with BCP, IOSCO and IAIS standards. Whether the unified supervisor is located inside or outside the central bank does not have a significant impact on the quality of supervision.

Arnone and Gambini (2007) used the degree of compliance with the BCPs to investigate the relationship between the compliance capacity of each country and the way these countries have organized their supervisory architecture, with particular reference to the two fundamental issues: the supervisory model and the role of the central bank. Two econometric tests based on an OLS specification with heteroskedasticity-robust standard errors show that a higher degree of compliance is achieved by those countries applying the unified supervisory model, with some evidence in favor of those established inside the central bank.

In contrast, Eichengreen and Dincer (2011) found, for a sample of 140 countries for the period 1998-2006, that the presence of independent supervisors located outside the central bank was associated with fewer nonperforming loans as a share of GDP, and that those countries were less prone to systemic banking crisis[26].

Finally, and as a transition to the next section, one more interesting finding in the supervisory evolution before the global crisis is that the 'conservative' countries show one common feature: the central bank is the sole (or the main) banking supervisor in 80 percent of the sample (61 out of 76) (Figure 8.7).

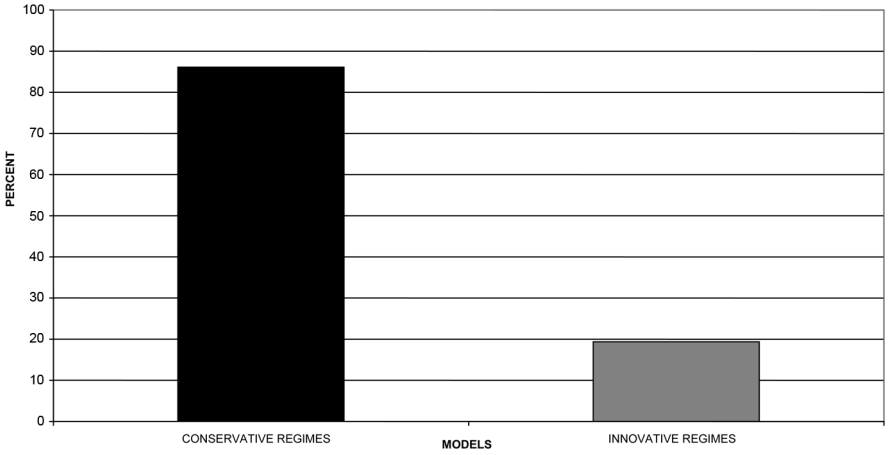
At the same time, the adoption of an 'innovative' model of supervision is centered on the role of the central bank in only very few cases (5 on 26 cases, 20 percent). In other words, the 'conservative' approach seems to have been more likely when the central bank was already deeply involved in supervision, while the 'innovative' approach seems to have been more likely if the main supervisor was historically different from the central bank.

8.4. THE ROLE OF THE CENTRAL BANK IN SUPERVISION

As discussed earlier, monetary policy and supervision both emerged from the financial liberalization period as stand-alone policy fields, in the sense that they were assigned objectives of their own. Traditionally, the functions of monetary policy and lender of last resort were assigned to the central bank (Goodhart *et al.* (1988) and Goodhart and Schoenmaker (1995a)). Supervision – to the extent that there was such a function – was either housed in the central bank or in a separate

[26] However their results become insignificant when the data of the 2008-2009 crisis are included.

Figure 8.7: The Central Bank as Main Supervisor: Conservative (silos) vs. Innovative (single and peak) Models (in %)



Source: Masciandaro and Quintyn (2009)

institution, or countries had a hybrid situation. For instance, Bank of England was in charge of banking supervision. The European continent had both models, and in the US, the function was divided between the FED and some specialized agencies (FDIC, OCC).

The separation of these policy fields led very quickly to the critical question as to whether their combination in one institution might lead to conflicts of interest. This paragraph discusses the economics of the role of central bank as supervisor (CBS). The aim is to show that the most relevant contributions of this huge literature dealing with the issue of CBS, provide contrasting recommendations.

From our current perspective (in 2013), to which we will come back later in this chapter, CBS can be evaluated from a theoretical perspective under two different points of view: macro supervision and micro supervision. Nowadays the central bank is generally considered the monetary authority, i.e. the agent designated by society to manage liquidity in order to pursue monetary policy goals. Being a source of liquidity and acting as lenders of last resort, central banks are naturally involved in preventing and managing systemic banking crisis[27] (macro supervision)[28] – in advanced, emerging[29] and developing

[27] Goodhart and Schoenmaker (1995), Masciandaro (1995 and 2007), Lacoue-Labarthe (2003), Rochet (2004), Nier (2009), Blinder (2010), Goodhart (2010), Brunnermeier *et al.* (2010), Borio (2007) and (2011), Nier *et al.* (2011), (Bernanke) 2011, Lamfalussy (2010), Bean (2011), CIEPR (2011).

[28] Gersbach (2011) claims that macro prudential supervision should be outside the central bank responsibilities, in order to avoid time inconsistency in pursuing the monetary policy goals.

[29] Kawai and Morgan (2012).

countries – in close coordination with government agencies entrusted with responsibility for financial stability[30].

But should central banks also be in charge of pursuing financial stability through prudential oversight of individual banks, i.e. micro-supervision? That question is a long standing one. That is where the actual discussion started (long before the distinction between macro and micro supervision was introduced).

On one side, micro-supervision is a task that historically has not always been assigned to central bankers[31]. Furthermore the last two decades (the age of the "Great Moderation"[32]) have been characterized by a decrease in CBS[33]. On the other side, in the previous decades several central banks were actively and deeply involved in pursuing tight structural controlling activities[34], which were considered thoroughly integrated in the overall responsibility of the central bank for managing liquidity.

Going beyond historical cyclical patterns and focusing on the economics of the relationship between monetary and supervision policies, is it possible to disentangle the pros (integration view) and cons (separation view) of having monetary and supervisory functions under one roof[35] (Table 8.2).

The justification for the central bank's high involvement in supervision (integration view) is usually supported by arguments related to the informational advantages and economies of scale that derive from bringing all functions under the umbrella of the authority in charge of managing liquidity[36]. One additional argument is that human capital employed by the central banks is presumably better equipped to also manage supervisory issues[37]. Having access to all information would help the more highly skilled central bankers to act as more effective supervisors. In other words, setting up a supervisory authority different from the central bank is not considered efficient, i.e. CBS brings potential gains to both activities.

At the same time, the economic literature acknowledges that central bankers involved in supervision can produce greater policy failure costs (separation view), i.e. limited CBS is better. The crucial argument supporting this point of view is that if the central banker – i.e. the liquidity manager – is also the supervisor, the risk of policy failure is greater. It is important to highlight that the risk of policy

30 De Graeve *et al.* (2008), Gerlach (2010), Angelini *et al.* (2012). For a survey see Oosterloo and de Haan (2004).
31 Ugolini (2011).
32 See among others, Bean (2011).
33 Masciandaro and Quintyn (2009), Eichengreen and Dincer (2011).
34 Cagliarini *et al.* (2010), Goodhart (2010), Bordo (2011), Toniolo (2011).
35 The integration versus separation approach was introduced in Masciandaro (2012).
36 See, among others, Bernanke (2011), Herrings and Carmassi (2008), Klomp and de Haan (2009), Blanchard *et al.* (2010), Blinder (2010), Lamfalussy (2010), Papademos (2010).
37 Apinis *et al.* (2010), Ito (2010), Lamfalussy (2010).

failure is endogenous with respect to the distribution of power: it exists only if the supervisor is the central bank, acting as liquidity manager. The risk of policy failure can be differently motivated, shedding light on the various sources of the policy failure risk.

First of all, if the supervisor can discretionally manage liquidity, the risk of moral hazard in supervised banks can increase[38] (moral hazard risk). If the supervisor is not the liquidity manager this source of moral hazard does not exist. Secondly, the discretionary action of the central bank can increase the uncertainty in supervised markets, as the recent on-again/off-again rescues of financial firms in the US have demonstrated[39] (uncertainty risk). If the supervisor is the liquidity manager greater moral hazard and greater uncertainty are likely to be produced.

Table 8.2: Integration and Separation Views on Central Bank Involvement in Supervision (CBS)

INTEGRATION VIEW (PROS): MOTIVATIONS	SEPARATION VIEW (CONS: POLICY FAILURE RISK): MOTIVATIONS
CBS can produce informational advantages and economies of scale (INFORMATION GAINS)	CBS can increase moral hazard uncertainty in supervised banks (MORAL HAZARD)
CBS can be more efficient, given that the human capital employed by central banks is better equipped to manage and oversee supervisory issues (HUMAN CAPITAL GAINS)	CBS can increase uncertainty in the markets (UNCERTAINTY)
	CBS can be less effective, given that monetary policy responsibilities can affect the behavior of central bank as supervisor, due to reputational and conflict-of-interest risks (DISTORTED INCENTIVES)
	CBS can be less effective, given that a central banker can use his/her powers to favor banking constituents, with related risk of capture (CAPTURE)
	CBS can be less effective: the more the supervisor is powerful (as the central bank is), the greater the risk of bureaucratic misconduct (BUREAUCRATIC OVERPOWER)

Thirdly, it has been highlighted that monetary policy responsibilities can negatively affect the central bank's behavior as supervisor[40], given the existence of reputational risks[41], as well as conflicts of interest between monetary policy and

[38] Masciandaro (2007), Lamfalussy (2010).
[39] Taylor (2010).
[40] Ioannidou (2005).
[41] Papademos (2010).

supervision management[42] (distorted incentives risk). Fourthly, the central banker can use his/her powers in liquidity management to please the banking constituencies, instead of pursuing social welfare. In this respect, the central bank can be the most dangerous case of a supervisor being captured by bankers[43], given that the banking industry may be more inclined to capture supervisors which are powerful[44] *(capture risk)*

Finally, the unification of banking supervision and monetary policy in the hands of the central bank can create an overly powerful bureaucracy with related risks of misconduct and raising fears of a "democratic deficit"[45] (*bureaucratic over-power risk*).

From this overview, it has become clear that the comparison between the integration and separation views remains inconclusive. There is simply no optimal solution in the CBS debate. This conclusion is confirmed by the empirical work undertaken in this context, although, it should be said, analyses so far of this topic are rare and very recent. The integration view finds empirical support in a study by Arnone and Gambini (2007), who use the degree of compliance with Basel Core Principles to investigate the possible relationship between the compliance capacity of each country and the way these countries have organized the role of the central bank in the supervisory process. The separation view seems to find support in a paper by Eichengreen and Dincer (2011), which indicates that the performance of financial markets is better when supervision is delegated to an agency different from the central bank[46]. However, results also show some evidence in favor of supervisory consolidation being established within the central bank. Finally other research has claimed that the fact the (unified) supervisor is located inside or outside the central bank does not have a significant impact on the quality of supervision[47].

A new dimension was added to the CBS discussion when the architecture of supervision became a topic for discussion (see previous section). While unified (or integrated) supervisors were recommended in some cases because of efficiency and effectiveness gains, the question as to whether this unified supervisor should be housed in the central bank remained open. The integration-view argued that this would allow the central bank to better prevent systemic issues from arising because the central bank would also be informed about imbalances arising in nonbank segments of the financial sector. The separation view argued that if all supervision was housed in the central bank, the latter would now also be respon-

[42] Goodhart and Schoenmaker (1995), Blinder (2010), Gerlach *et al.* (2009), Masciandaro *et al.* (2011).
[43] Barth *et al.* (2004), Djankov *et al.* (2002), Quintyn and Taylor (2002), Boyer and Ponce (2011a) and (2011b).
[44] Boyer and Ponce (2011a) and (2011b).
[45] Padoa Schioppa (2003), Masciandaro (2007), Blinder (2010), Oritani (2010), Goodhart (2010), Eichengreen and Dincer (2011).
[46] Eichengreen and Dincer (2011).
[47] Čihák and Podpiera (2007).

sible for supervision of institutions with which it has traditionally never dealt, neither as lender of last resort, nor as monetary policy agent. So, the argument went, extending its supervisory powers to those other financial institution would put pressure on extending its lender-of-last-resort web as well, hence creating more opportunities for moral hazard and reputational risk.

Thus, at the end of the day, the review of the literature shows that all the various arguments lead to conflicting predictions in terms of what the optimal involvement of the central bank in supervision should be. No consensus has been reached on what should be in principle the best degree of CBS, since it is impossible to evaluate in general, objective and invariable terms the pros and cons of each specific aspect of supervision being delegated to the central bank. In other words, it is not possible to conclude that the integration view is superior to the separation view, and vice versa. The same conclusion can be reached if we consider the integration versus separation dilemma from the monetary policy point of view[48]. In view of all conflicting arguments, it is not a surprise that there is no agreement on the appropriate degree of the central bank involvement.

If this line of thinking is correct, one additional conclusion can be reached: the cyclical pattern of CBS that we observe in the reality cannot be explained by the existence of a superior setting for delegating powers to central banks. Rather, the different arguments supporting the integration view or the separation view can be more or less important in the minds of those who design and implement the supervisory regime. What we are saying is that the research attention has to focus on the agent responsible for monetary and financial settings, i.e. the policymaker, using both the economic and the political economy approaches[49].

Moving from the theoretical to the institutional analysis and wondering if the role of central bank as supervisor has changed in the last two decades, toward integration rather than separation, a question naturally arises: How can CBS be evaluated? Or in a more challenging way: it is possible to measure the evolution of CBS, using the qualitative narrative of the actual central bank regimes to arrive at quantitative analyses? This was the motivation to construct the indexes for the central bank's involvement in supervision[50]. The indexes were created with a view to analyzing which, and how many, authorities are empowered to supervise the three traditional sectors of financial activity: banking, securities, insurance.

[48] See Goodhart and Schoenmaker (1995), Arnone *et al.* (2007), Masciandaro (2007) and Hussain (2009) for comprehensive reviews of the literature, that consider the question also from the monetary policy effectiveness point of view. On this issue, as well as on the related consequences on central bank governance, see also Goodhart *et al.* (2009), Crockett (2010), Papademos (2010), Svensson (2010), Aydin and Volkan (2011) and Woodford (2012). For the specific relationship between central bank involvement in supervision and the (internal and external) monetary regimes see Dalla Pellegrina, Masciandaro and Pansini (2011) and (2012).

[49] Masciandaro (2006, 2007 and 2009), Masciandaro and Quintyn (2008).

[50] Masciandaro (2006, 2007 and 2008), Masciandaro and Quintyn (2009).

To transform qualitative information into quantitative indicators, the Central Bank as Financial Supervisor (CBFS) Index[51] was constructed. The CBFS is a measure of the level of central bank involvement in supervision; it is derived by applying the classical numerical index proposed by Herfindahl and Hirschman to this novel field[52]. The CBFS index is used to calculate the degree of CBS. The robustness of the application of the CBFS index depends on the following two key hypotheses[53].

First, it must be possible to define the different sectors to be supervised (institutional dimension) for every given country (geographical dimension). In other words, in every country, each single financial market constitutes a distinct market for supervision. In fact, it is still possible to identify both the geographical dimension – the existence of separate nations – and the institutional dimension – the existence of separate markets – notwithstanding the fact that the blurring of the traditional boundaries between banking, securities, and insurance activities and the formation of large financial conglomerates have diluted the definition of intermediaries. Then, for each sector, in case of the presence of more than one agency, the distribution of the supervisory powers among different authorities, and consequently their share of involvement, in supervision was defined without ambiguity. In each sector, as the degree of supervision consolidation falls, the greater is the number of authorities involved in monitoring activity.

Secondly, the power of supervision was considered as a whole. Given different kinds of supervisory activity (banking supervision, securities markets supervision, insurance supervision) there is perfect substitutability in terms of supervisory power and/or supervisory skills. Supervisory power is a feature of each authority as agency, irrespective of where this power is exercised (agency dimension). Consequently, in each country and for each authority, we have summed the share of the supervisory power it enjoys in one sector with the share it owns in another one (if any). For each authority, as the degree of supervisory power increases, the greater is the number of sectors over which that agency exercises monitoring responsibility. All three dimensions – geographical, institutional and agency – have legal foundations and economic meaning.

The intuition behind this methodology is quite simple: the greater the share of the central bank's supervisory powers, the greater the odds that the central bank will be involved in the overall supervisory organization. In other words, CBS is likely to be at a maximum when the central banker is the unified supervisor in charge, while the involvement is likely to be low, the smaller the number of sectors over which the central bank has supervisory responsibilities. In order to construct the

[51] Masciandaro and Quintyn (2011) Masciandaro, Pansini and Quintyn (2011).
[52] Hirschman (1964).
[53] Masciandaro and Quintyn (2011).

CBFS index, it is just sufficient to measure the share of supervision assigned to the central bank in each country, which can go from 0 to 1.

By using this index, it is possible to show how CBS has changed before and after the Crisis[54]. The evolution of the CBFS index was described by drawing upon an 88-country database for the 1998-2009 period. Inspection of this database before the crisis highlights a trend toward supervision consolidation outside central banks, where outliers are those central banks without monopoly over monetary policy responsibilities.

In other words, before the crisis the trend of change in supervision structures seemed to be leading to two distinctive features: consolidation and specialization. The reforms were driven by a general tendency to reduce the number of agencies, in order either to reach a unified model of supervision or the so-called twin peaks model[55]. In both models, supervisors are specialized, and have a well-defined mission. The trend towards specialization becomes particularly evident noting the route that national central banks are following. Those banks with full responsibility for monetary policy – the FED, the ECB, the Bank of England, the Bank of Japan – did not have full responsibility for supervisory policy. The worldwide rise of specialization in monetary policy led to central bank reforms that gave a clear mandate, focused on price stability, and greater political and economic independence; the best practices in the monetary regime design can be summarized as: flexible policy rules, conducted by an independent and accountable central bank acting in a flexible exchange rate environment[56].

This does not mean that these banks were not concerned with financial stability – actually the opposite was true, as we would later observe during the Crisis – but they usually tended to address it from a macroeconomic perspective, as a function of their primary mission, i.e. monetary policy. Amidst the central banks which did not have full responsibility for monetary policy, such as those belonging to the European Monetary Union, several banks chose to specialize in supervision[57]. In general, it was noted that the central banks of EMU members were becoming financial stability agencies. The explanation is simple: when the central banker is no longer the unique manager of liquidity – as in the case of the central banks who joined the Euro-zone – the expected downsides of involving them in supervision become weaker, and the integration view gains momentum.

In general, analyses based on the CBFS Index concluded that before the crisis the distance between central banks and supervisory responsibilities was substantially increased. The separation view dominated. On political economy grounds we can

54 Masciandaro, Pansini and Quintyn (2011).
55 Masciandaro and Quintyn (2009 and 2011).
56 Cukierman (2008).
57 Herring and Carmassi (2008).

say that, on average, policymakers gave more weight to the expected gains for specializing the central bank as monetary agent and another authority as supervisory agency, with respect to the benefits of delegating both functions to the central bank and facing the potential costs connected with the risk of policy failures. The optimal degree of CBS was likely to decrease.

8.5. THE GOVERNANCE OF SUPERVISION

The next theme that got into the spotlight was supervisory governance. A first discussion of some aspects thereof emerged at the time of the S&L crisis in the US. Supervisory forbearance was seen as one of the main contributing factors to this crisis. Forbearance can be a result of political, industry or self-interest capture – in other words, of misaligned incentives for supervisors, hence a governance failure.

Let us take a step back. Financial supervisors' main task is to monitor the actions of the supervised institutions and, when necessary, impose sanctions and enforce them. So a key component of the supervisory framework is the nature, timing and form of intervention in case the health of an individual institution fails. In the new, deregulated environment, it became quickly clear that the decision as to when and how to intervene in a problem bank is the Achilles heel of the supervisory process, for a number of reasons[58]. First, a weak regulatory framework inherently leads to weak supervision and lack of enforcement rules[59]. Secondly, politicians may dissuade supervisors from intervening in a problem institution for fear that this (connected) institution gets a bad press, or worse. Weak judgment is a third factor that could influence the supervisory decisions. Supervisors, faced with bank problems may believe that these problems are temporary and will go away without supervisory action. Finally, some form of self-interest may also be at play. Supervisors, faced with a problem bank, may take a "not on my watch"-approach and hide the problems as long as possible. This behavior can be explained by the fact that society may see the problems in a bank as a reflection of weak supervision which is damaging for the supervisor's reputation.

Whatever their cause, these situations typically lead to forbearance, i.e. refraining from addressing an institution's problems head on. Forbearance is bound to lead to a deepening of the problems in that specific institution, and ultimately to an increase in the costs of addressing them, among others because of the danger of contagion. Thus, forbearance revealed a fundamental commitment problem on

[58] Barth *et al.* (2006), Quintyn (2009).

[59] For instance, the regulatory framework may lack pointers for supervisors regarding the timing of an intervention, may not be specific enough regarding the intervention instruments, or may leave the supervisors without the power to collect the critical data to properly analyze a financial institution's health.

the part of supervisors, analogous to the time consistency problem confronted by monetary policy agents. Hence, supervisory governance arrangements that align their incentives are needed. Several authors, such as Kane (1989) and Randall (1993) demonstrated that supervisory forbearance was one of the main contributing factors to the S&L crisis. Kane, in particular was of the view that self-interest capture was strongly present (the "not on my watch" syndrome)[60].

The ensuing debate highlighted the need to pay close attention to the regulators' incentive structures, remuneration arrangements, and accountability measures. The proposed solutions did not focus on an all-encompassing approach of governance but emphasized that supervisors, even politically independent ones would benefit from the presence of intervention rules to avoid succumbing to political and other pressures. An influential proposal by Benston and Kaufman (1988) promoted a system of predetermined capital/asset ratios that would trigger structured actions by supervisors. They called it structured early intervention and resolution (SEIR). A version of SEIR was adopted by the US Government as "prompt corrective action (PCA) in the 1991 Federal Deposit Insurance Corporation Improvement Act (FDICIA). Their proposal opened the "rules versus discretion" debate for supervisory intervention. Instead of leaving the decision as to when and how to intervene in ailing banks (discretion) in the hands of supervisors, they proposed rules specifying when and how supervisors need to intervene. The main objective behind systems of SEIR is to minimize the losses for depositors, deposit insurance and, by extension taxpayers, but it also serves as an instrument to align supervisors' incentives. From a governance point of view, such rules could be an effective instrument as they shield the supervisors from all three types of capture (political, industry and self) in the sense that they offer some "objective" and binding thresholds as to how and when to intervene in weak and failing institutions.

Since the adoption of PCA in the US, a number of countries, including Japan, Korea and Mexico, have followed this example and more are contemplating its adoption. In the aftermath of the 2007-08 Crisis, the debate has been reopened with calls from various circles, academic and policy, for more rules in the intervention process[61]. PCA certainly has a lot of appeal as a governance device to address the supervisors' commitment problem, but it should be seen in the broader context of governance arrangements.

The "rules versus discretion" debate, of which the PCA discussion is a part, is now, more than ever before at the table in the context of the policies and instruments that are part and parcel of macro prudential supervision. Many scholars argue that, given the political economy aspects of macro prudential supervision

[60] See also Boot and Thakor (1993) on this topic.

[61] Three publications in support of PCA in the EU are The European Shadow Financial Regulatory Committee (2005), Mayes, Nieto and Wall (2008) and Dermine and Schoenmaker (2010).

(best summarized as "taking away the punch bowl when the party gets going"), some form of a rules-based system in support of the decision-making process will be more effective than a system solely based on discretion. We will come back to this in the last section of this chapter.

By the late 1990s, three interconnected drivers accelerated the discussion on the broader governance features of supervision: first, in several of the systemic financial crises of the 1990s, the lack of supervisory independence from political influences, leading to forbearance, was cited as one of the contributing factors to the deepening of the crisis (Lindgren *et al.* (1999) and Rochet (2003)). Secondly, the governance debate came to the surface as part of the institutional questions that we discussed earlier. During the two decades before the Global Crisis, we had observed a tendency to move supervision out of the central bank. While in the central bank, supervision "piggybacked" in several countries explicitly or implicitly on the central bank's independence in matters of monetary policy. So, when supervision was relocated, the issue of independence needed to be addressed explicitly.

The third driver is closely related to the second one. Central bank independence (CBI) started to gain more and more ground as an institutional arrangement that countered time-inconsistency in policymaking. In particular the tendency to resort to forbearance – often under political pressure – in the face of systemic banking crises, showed that time-inconsistency is also an issue in supervision.

Given the special nature of financial supervision, it soon became clear that, in order to align the incentives for supervisors, independence was a necessary but not sufficient governance feature in the face of pressures coming from the political and the industry side. The major difference between a monetary policy agency and a financial supervisor lies in the fact that the former has a well-specified and measurable objective (maintaining low and stable inflation, often specified in a numerical target), while it is difficult – if not impossible – to specify the objective of the latter in the same precise way[62]. So applying a contractual approach in the principal-agent sense would be flawed because any such contract is bound to be radically incomplete given the great range of contingencies that occur in regulation and supervision, as well as the difficulty of specifying the agent's objectives precisely (Quintyn and Taylor (2007) and Quintyn (2007)). As Majone (2005) pointed out, incomplete contracts lead to problems of imperfect commitment, opening the door to time inconsistency.

Hence, supervisors should be considered as a fiduciary of the government whose duties are defined by relational contracting: the parties do not agree on a detailed plan of action, but on general principles and procedures, on types of actions to be

[62] For more details regarding this comparison, see Hüpkes, Quintyn and Taylor (2005).

taken and instruments to be used. The key feature is the choice of a mechanism for adapting the contract to unforeseen contingencies. The great range of contingencies is certainly one of the reasons why politicians are reluctant to grant supervisors far-reaching independence. However, because this reintroduces the risk for political capture, the better alternative is to establish a detailed structure of accountability arrangements, whereby supervisors are accountable to all major stakeholders (Hüpkes, Quintyn and Taylor (2005) and Masciandaro, Quintyn and Taylor (2010)). The design of accountability arrangements is all the more important because well-designed arrangements can help buttress agency independence[63]. So the complementarity between accountability and independence needs to be exploited at its fullest. Das and Quintyn (2002) and Quintyn (2007) proposed to add transparency and agency-integrity as two additional pillars to the supervisory governance framework.

In order to find out to what extent the governance debate caught on among policymakers, measures of governance needed to be defined. Quintyn, Ramirez and Taylor (2007) set the stage by defining criteria of supervisory independence and accountability and using them as yardsticks to rate supervisory agencies, very much like what had become standard practice in the central bank independence literature[64]. They selected a sample of 32 countries that had reformed their supervisory agency in the decade-and-a-half before the Global Crisis and compared governance arrangements for supervisors before and after these reforms. A general trend towards more independence and accountability was indeed observed following reforms (Table 8.3).

However, the table also shows that (i) across agencies, supervisors in central banks remain more independent than their counterparts elsewhere, but their accountability arrangements are weaker; (ii) within categories of agencies, the gap between independence and accountability is wide for central banks, while arrangements for agencies outside central banks are more balanced (65-64 for unified supervisors). At the same time, these scores are not extremely high; and (iii) over time, the gap between independence and accountability arrangements for central banks hardly narrowed, while it did narrow for the other categories. So, while the institutional reforms were used to grant higher independence to supervisors in general, similar strides were not made in the area of accountability, probably because of a fair degree of unfamiliarity with accountability.

Masciandaro, Quintyn and Taylor (2010) econometrically surveyed the determinants of the shifts in the supervisory governance. They found that politicians' decisions on the degree of independence and accountability of their supervisors

[63] Wide-ranging accountability is also consistent with the "representation hypothesis" of Dewatripont and Tirole (1994): supervisors are accountable to those whom they represent.

[64] See Quintyn, Ramirez and Taylor (2007) for the criteria that were used and the way the ratings were done.

Table 8.3: Accountability and Independence before and after Reforms of the Supervisory Architecture: Trends by Location of Institution (Average rating)

	Inside Central Bank	Outside Central Bank	Of which Unified Supervision
Total rating			
Before reforms	46	46	48
After reforms	64	64	65
Independence			
Before reforms	58	51	52
After reforms	73	66	65
Accountability			
Before reforms	36	41	44
After reforms	56	62	64

Ratings are on a scale for 0 (low) to 100 (high independence and accountability).

Source: Quintyn, Ramirez and Taylor (2007)

seem to be driven by a different set of considerations. Only polity plays a role in both, meaning that the more mature a democracy is, the more likely it is that higher degrees of independence and accountability will be granted. Accountability is additionally driven by crisis experiences and the quality of public sector governance, while independence is influenced by a kind of demonstration effect. The paper also confirmed that the location of the supervisor has an influence. The paper modeled a two-stage decision making process by the policymaker (inside or outside central bank, unified or not). Location and functional integration do not seem to have a great impact on the probability of high independence, but they do have an impact on the degree of accountability. Indeed, the likelihood for more elaborate accountability increases when the central bank is not the supervisor. This is obviously related to the fact that central bank accountability arrangements are and remain predominantly geared toward monetary policy, which is less demanding than supervision[65].

8.6. THE BIG SUPERVISORY QUESTIONS AFTER THE CRISIS

On the eve of the Global Crisis financial supervision had evolved a lot, compared to some 30 years before that. Many countries had attempted to make their supervisory framework more efficient and effective. Academic interest in the topic had increased, although, as we have seen, the debates themselves remained highly inconclusive. The accumulation of systemic crises had also generated the involve-

[65] See Hüpkes, Quintyn and Taylor (2005) on this topic.

ment of international financial institutions (BIS, IMF and World Bank) in supervisory issues[66]. Given the open-ended nature of the academic debates, it does not come as a big surprise that the empirical evidence on the impact of the various reform agendas on financial sector stability too remained inconclusive, as we have demonstrated in the previous paragraphs.

But then came the Global Crisis, which put into question a lot of the acquired wisdom in both the regulatory and supervisory areas, and led to some important paradigm-shifts. While the literature on the causes and origins of the Crisis focuses heavily on macroeconomic imbalances, macroeconomic policy failures, as well as regulatory failures in all segments of the financial system as major contributing factors[67], a more specialized literature provides a detailed account of the contribution of supervisory failures to the crisis[68].

Failures attributable to supervisory architectures as such are only mentioned in two specific cases. In the United States, some pointed at the fragmented US supervisory system as a major contributor to the crisis (Leijonhufvud (2009)). In the United Kingdom coordination failures between FSA and Bank of England (and UK Treasury) were mentioned in the Northern Rock episode, thereby indirectly referring to the supervisory architecture (Buiter (2008) and FSA (2009)). The other generally heard claim is that, in all of the countries stricken by the crisis, no institution was in charge of macro-prudential or systemic supervision, which is now generally recognized as an architectural failure. Finally there are also the counterfactuals: in the wake of the crisis several countries revamped their supervisory architecture (Belgium, Germany, Ireland, and the UK) which could serve as an indication that flaws in the architecture were blamed in part for the crisis in these countries.

Flaws in supervisory governance are well-documented. Most authors identify more or less the same issues, often named somewhat differently, with Palmer and Cerutti (2009) presenting the most thorough and complete account. Thus, authors identify weak supervisory independence and accountability, industry or political capture, wrong incentive structures provided by the political establishment, lack of audacity to probe or to take matters to their conclusion and to be intrusive, as well as the difficulties of supervisors to match the financial engineering skills of financial experts in private institutions[69,70].

[66] The Basel Core Principles for Effective Supervision, for instance, had several principles that were concerned with supervisory practices. Principle 1 stated that supervisors should have "operational autonomy."

[67] See among others, Allen and Carletti (2009), Brunnemeier *et al.* (2009), Buiter (2008) and Roubini (2008).

[68] See for instance Financial Services Authority (2009), Palmer and Cerutti (2009), Tabellini (2008), Viñals *et al.* (2010) and Weder di Mauro (2009).

[69] At the international level (with respect to cross-border supervision) most authors point at a misalignment of incentives for supervisors to voluntarily cooperate, a lack of binding coordinating mechanisms, and differences in levels of supervisory quality.

[70] On this last point, see also Goodhart, Chapter 7 in this volume.

Figure 8.8 shows some evidence of governance failures: among the "victims" of the 2008 Crisis, we count several countries that scored among the highest on the governance index. As it turns out, 11 of the 15 first ranked in this figure were affected severely. The five countries with the highest governance rankings were confronted with failing institutions or institutions that needed government assistance representing anywhere between 20 and 80 percent of total assets of the sector (note that the numbers from Laeven and Valencia (2010) did not yet reflect the problems in Spain, number six in the figure). Further down these high rankings, we observe two other clusters of countries that faced intense banking problems. So, only a few countries escaped these dramatic developments.

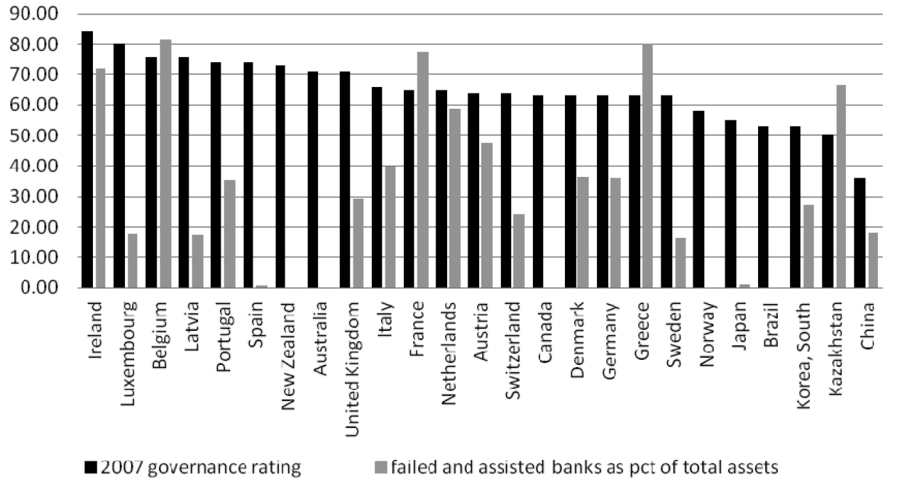
In sum, the narrative account of the role of supervision in the Global Crisis indicates that several of the hoped-for improvements in the effectiveness and the incentive structure for supervision did not work. The same behaviors, documented during previous crises, such as the "not on my watch" approach and the "sweeping of problems under the carpet" had occurred again, sometimes at massive scales. A recent empirical analysis (Masciandaro, Pansini and Quintyn (2012)) confirms that neither supervisory architecture nor improvements in supervisory governance were able to prevent or mitigate the crisis, putting into question a large number of assertions that were made before the Crisis.

8.6.1. What have been the Responses?

While most of the policymakers' and the academics' attention has been going towards reforming the regulatory framework, supervisory issues have also received due attention. Below we will discuss the new trends regarding supervisory architecture and governance. However, these trends need to be interpreted against the most important new development that is affecting supervision in the wake of the crisis, the emergence of macro prudential supervision as a standalone supervisory domain (with specific mandate, instruments and dedicated staff). The neglect, or lack of understanding, of systemic risks in the financial system in the run-up to the Global Crisis has made it clear that it is crucial to monitor and assess the threats to financial stability arising from macroeconomic as well as macro financial developments. This growing emphasis on macro supervision forces policymakers to identify specific agencies responsible for systemic stability.

Two trends prevail in this regard: although the institutional forms vary and are evolving, a dominant trend is to assign this task to the central bank, or for the central bank to play a pivotal role. Nier *et al.* (2011a) report that in 19 out of 21 countries that have a formal mandate for macro prudential supervision, the central bank is the sole institution in charge, or plays a key role together with one

Figure 8.8: The Global Crisis: Supervisory Governance and Failed and Assisted Banks



Source: own calculations for governance indicators and Laeven and Valencia (2010) for bank data.

or more other institutions[71]. We also notice a significant level of government involvement in this new policy field in some countries, at least at the decision-making level (Nier *et al.* (2011a and b))[72].

To carry out macro-prudential tasks, information on the economic and financial system as a whole is required. The current turmoil has stressed the role of the central banks in the prevention, management and resolution of financial crisis. Therefore, the view is gaining momentum that central banks are in the best position to collect and analyze this kind of information, given their role in managing monetary policy in normal times and the lender of last resort function in exceptional times.

Therefore, from the policymakers' point of view the involvement of the central bank in macro supervision involves potential benefits in terms of information gathering and sharing (Cecchetti (2008)). At the same time they can postulate that the potential costs of the involvement in macro prudential supervision are smaller than with respect to micro prudential supervision. Thus, the general acceptance of macro prudential supervision as a new policy domain has re-opened the debate about the role of the central bank in supervision, but with new and additional arguments[73].

[71] These institutions include financial stability council, ministry of finance, bank supervisor, integrated supervisor, supervisor of other subsector or deposit insurance agency.

[72] For a complete discussion of the institutional models for macro prudential supervision, see Nier *et al.* (2011a and 2011b).

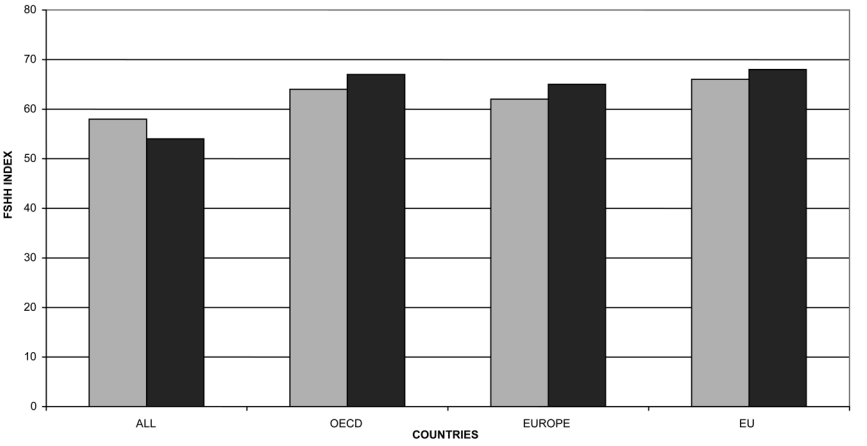
[73] For overviews, see among others Borio (2003), Galati and Moessner (2011), Jacome *et al.* (2011), Goodhart (2012) and Agur and Sharma (2013).

8.6.2. Trends in Supervisory Architecture and the Role of the Central Bank

Starting with the degree of consolidation, Figure 8.9 compares the situation before and after the crisis for groups of countries. Before the crisis – 2007, grey bars – the degree of consolidation was on average greater in the EU than in the industrial countries as a whole, or Europe; these three groups score higher than the overall country sample. The consolidation process in the above three groupings of countries has continued during the crisis – 2009, black bars – while for the entire sample, we notice a slight reduction in the degree of consolidation. In sum, during the crisis supervisory reforms in the advanced countries continued to be driven by a general tendency to reduce the number of agencies to reach the unified model or the peak model – which dominated the trends in the two decades 1986-2006 (Masciandaro and Quintyn (2009))[74].

Figure 8.10 compares the CBSS Index before and after the crisis. Two facts emerge. Before the crisis – 2007, grey bars – advanced countries show on average a lower level of central bank involvement in micro supervision than the entire sample. In turn, among advanced countries, the European countries and the EU members demonstrate higher degrees of central bank involvement in supervision. However, after the crisis we witness a sort of "Great Reversal": the 2009 data (black bars) show that in advanced, European and EU countries, central bank involvement has increased, while it decreased slightly for the entire sample.

Figure 8.9: Financial Supervision Unification
(grey bar= before the Crisis; black bar=after the crisis)



Source: Masciandaro, Pansini and Quintyn (2012)

[74] The cases of Belgium, Germany, Italy, and UK – where authorities have decided to reduce the degree of supervisory consolidation--are not reflected in our data because they are not yet implemented.

Box 8.1: Some country-specific examples

The general trend is confirmed by the reforms undertaken in a number of advanced countries, where policymakers have legislated an extension of the supervisory powers assigned to the central banks. On July 2010, US President Barack Obama signed the Dodd-Frank Act into law, which is considered to be the most important overhaul of financial regulation since the Great Depression. A rethinking of the role of the Fed is part of the restyling of financial legislation. Despite the fact that during the discussion of the bill US lawmakers debated the possibility of restricting some of the Fed's regulatory responsibilities (supervision of small banks, emergency lending powers), as well as increasing the political control over the central bank with changes in its governance (congressional audits of monetary policy decisions, presidential nomination of the Presidents of the New York Federal Reserve), the Dodd-Frank law ended up increasing the powers of the Fed as banking supervisor.

In Europe, policymakers are moving to finalize reforms concerning the central banks' involvement in supervision both at international and national levels. In 2010, the European governing bodies established the European Systemic Risk Board (ESRB) for macro prudential supervision which is dominated by the ECB and in 2012 the same bodies proposed to increase the ECB powers also in micro supervision, with the ECB becoming the hub of the European Single Supervisory Mechanism in 2014.

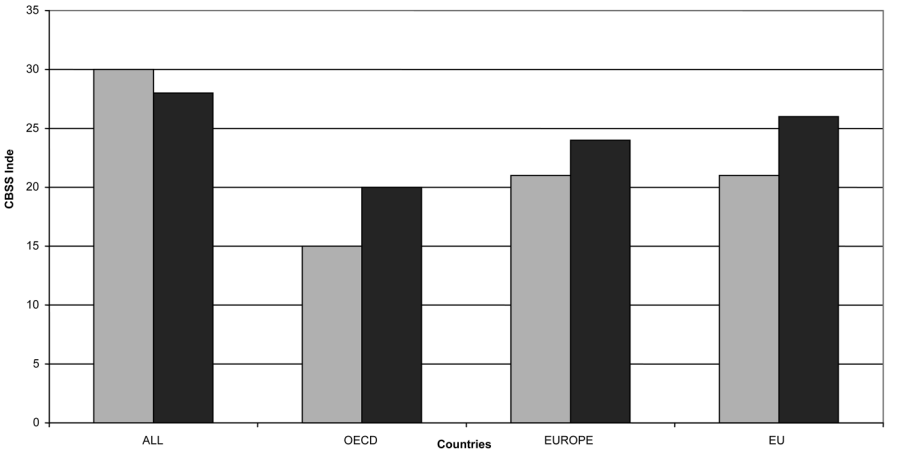
Concerning individual EU members, in 2008 the German grand coalition government expressed its willingness to dismantle its sole financial supervisor (BAFIN) in favor of the Bundesbank. In June 2010 the UK government also unveiled the reform of the bank supervisory system aimed at consolidating the supervision powers in the Bank of England, which will be implemented in April 2013. The key functions of the Financial Services Authority (FSA) might then be moved within the Bank of England, which is set to become the Prudential Regulatory Authority. In the summer of 2010 the Irish Financial Services Regulatory Authority was legally merged with the central bank. Finally in the summer of 2012 the Italian Government proposed to increase the role of the Banca d'Italia in monitoring financial stability cross banking, insurance and pension fund markets.

The main explanation for this divergence is that Euro-zone central banks have continued to become more involved in micro supervision because their monetary policy responsibilities are limited. They have chosen the route of specialization in surveillance. The most emblematic cases are Belgium, Germany, Ireland, the Netherlands and the Slovak Republic. In that context, Herring and Carmassi (2008) noted that national central banks of the Euro zone have predominantly become financial stability agencies.

8.6.3. Trends in Supervisory Governance

Figure 8.11 presents the shifts in the wake of the Global Crisis. Before the crisis – 2007, grey bars – the quality of governance arrangements was rated the highest in the EU, followed by Europe and finally the industrial countries. The scores of these three groupings are significantly higher than the overall country sample. In the wake of the crisis, and in response to what happened during the crisis – 2009 – all the groupings show further efforts to strengthen governance.

Figure 8.10: Central Bank Involvement in Supervision
(grey bar = before the Crisis, black bar= after the Crisis)



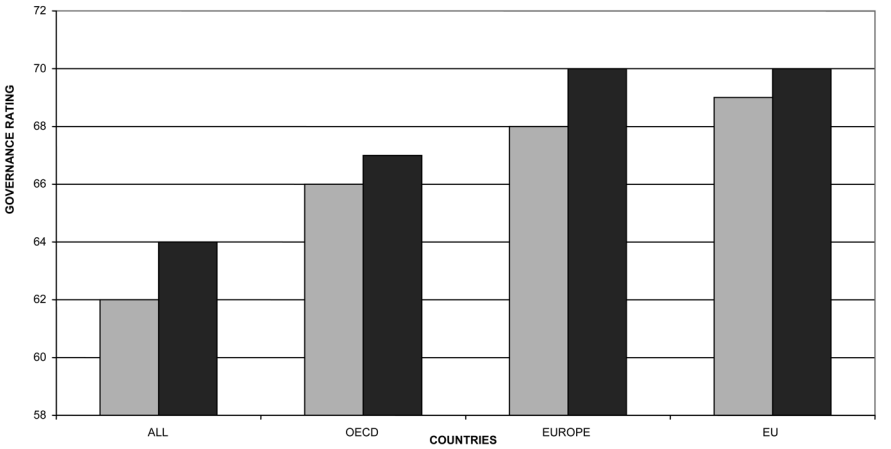
Source: Masciandaro, Pansini and Quintyn (2013)

8.7. SUPERVISION, QUO VADIS?

The crisis has shaken up all aspects of the supervisory debate. Going forward, policymakers should internalize the lessons learned, as well as the new insights in order to improve on the experience with supervision. This last section provides our input into the debate to make supervision more effective. Table 8.4 brings together our views as to how the future supervisory constellation could be conceived with a view to enhancing its effectiveness. These views culminate in our proposal to separate the agencies that conduct macro- and micro-supervision as a way for creating checks and balances that would strengthen the governance of oversight.

The next sections justify this proposal. We start off by underlining some limitations to supervisory governance and go from there on to propose a new architecture that can potentially strengthen governance. While we believe strongly in the merits of this proposal, we also notice that trends in some regions in the world,

Figure 8.11: Supervisory Governance Ratings
(grey bar = before the Crisis, black bar= after the crisis)



Source: Masciandaro, Pansini and Quintyn (2013)

most notably the EU, go in a different direction, the direction of more concentration of monetary and supervisory powers into one institution or network of institutions. The concentration is likely to be tempered by using "Chinese walls"- procedures to separate monetary and supervisory responsibilities. However, even with impenetrable Chinese walls, there is still a big chance that the public at large and politicians will consider any decision as being taken by "the" central bank. So the reputational risk and the perception of a democratic deficit might still live on.

8.7.1. The Limitations to Supervisory Governance

While further strengthening of supervisory governance is critical, we also need to realize that the Global Crisis has brought its limitations and potential pitfalls to the surface. It is beyond doubt that financial supervision needs to rest on solid governance pillars to cope successfully with the three types of capture discussed earlier (Schuler (2003), Masciandaro, Quintyn and Taylor (2010) and Dijkstra (2010)). Supervisory independence is on average still much lower than monetary policy independence. Accountability arrangements – the indispensable complement to independence – are often poorly developed.

However, experience of the last two decades also points in the direction of some critical limitations with respect to the potential impact of supervisory governance. These limitations go back to an argument that was developed earlier in this chapter: by the nature of the supervisory work, the contract between the supervisor and society will always be radically incomplete given the great range

of contingencies that can occur in regulation and supervision. Hence, it is misleading to believe that supervisory governance arrangements can be defined and implemented in such a way that each and every possibility of political, industry and self-capture will be eliminated. So, the first best solution, i.e., define the right governance arrangements to address the supervisors' incentive and commitment problems has its own limitations.

Table 8.4: Key Considerations for Building Effective Supervisory Frameworks

	Macro-prudential supervision	Micro-prudential supervision
Degree of unification/ integration/consolidation across sectors	Some form of consolidated (i.e. across sectors) supervision is necessary to arrive at all-encompassing overview of risks in the system	Considerations pro and con are basically the same as developed in the section on the architecture, i.e. they are country-specific.
Degree of central bank involvement	Central bank should play a key role in macro-prudential supervision because it is in the best position to collect and analyze the information needed, and the proximity of the lender-of-last resort function. Yet, conflicts of interest might also arise between monetary policy and macroprudential supervision and policy.	Arguments pro and contra housing in central bank are the same as those presented in the section on the role of the central bank. However, there is one new argument: checks and balances between macro- and micro-prudential argue for having micro prudential outside central bank (if macro is in central bank) In addition, having both in central bank makes the latter a very powerful (perhaps too powerful) institution
Governance arrangements	Given the nature of macro-prudential supervision, strong governance arrangements are needed.	Strong governance arrangements are needed
	Ideally, macro-supervisors should rely on a set of strong rules (more than discretion) because the political economy considerations will be challenging	There is some need for rules (as opposed to discretion) in particular in area of bank intervention and closures.
	Strong consideration should be given to organize macro- and micro-prudential supervision in separate agencies. This would introduce checks and balances between both which is likely to strengthen and improve supervisory governance and would avoid that one institution becomes too powerful.	

Moreover, the crisis experience has demonstrated that some of the more successful approaches to supervision are the result of long-established and long-fostered corporate cultures that have helped to brace the institution against various forms of capture. In other words, effective supervisory governance needs to be nurtured by the right corporate culture. Or, de facto independence seems at least as important as de jure independence. The crisis record shows indeed that, on the one hand, several countries with strong (de jure) governance arrangements were most severely hit by the crisis, while others with relatively weaker arrangements on paper emerged relatively unscathed from the crisis. Palmer and Cerutti (2009), point in this respect to the case of Canada: the supervisory agency lists not among the highest scores on de jure independence, but its de facto independence is high, which, combined with a strong supervisory culture, has contributed to escaping from the crisis. So the bottom line is that improvements in supervisory governance per se, are not a panacea for all supervisory failures. Improvements in supervisory governance must be supported by changes in supervisory approaches and cultures, and that takes time.

Combining these two major arguments – governance arrangements will always have their limitations, because of the impossibility to write a contract (in the principal-agent sense) that fully aligns incentives, and governance arrangements do not per se lead to improvements in supervision if their spirit is not fully embraced by the institution – forces us to think in other directions to limit the potential risk for supervisory failures.

Finally, it worth noting that macro prudential supervision will be confronted with exactly the same governance issues. This new policy domain will also be working under a hard-to-define and hard-to-measure objective, and its contract will also be incomplete because of the wide range of contingencies. Such issues will be magnified in the macro prudential domain because the impact of macro prudential decisions will be even more visible and more felt throughout society.

8.7.2. The Way Forward: "divide et impera"

Our proposal for enhancing supervisory effectiveness takes advantage of the current trends in the supervisory architecture: the separation of macro and micro prudential supervision offers a great opportunity to conceive a solution that offsets some of the inherent weaknesses that we just discussed: let us combine the new architecture with good governance practices to better align supervisory incentives.

Here is the reasoning: we argue for an institutional separation between macro and micro prudential supervision. The presence of two institutions involved in the same field of operation, but with a different mandate, would allow for checks and

balances to exist among both institutions which could reduce the likelihood of capture (of any type), and thus strengthen supervisory governance. "*Divide et impera*" in this context means: divide the responsibilities so that better governance can reign. This proposal is inspired by a model developed by Laffont and Martimort (1999) and a recent extension of their work by Boyer and Ponce (2012).

Laffont and Martimort's model starts from the idea that the power of a supervisory agency is its ability to use some piece of information it has learned on the supervised entity to improve social welfare. They show that, when benevolent supervisors are in charge of implementing the socially optimal contract, there is no reason for the separation of powers. They always use their possible discretion, i.e., their power, to maximize social welfare. However, non benevolent supervisors may use their power to pursue personal agendas, for example by colluding with the supervised entity. In this case separation has advantages. Separation of supervisors divides the information and thus limits their discretion in engaging in socially wasteful activities. Instead of having a unique supervisor implementing the privately efficient collusive offer to the regulated firm, separation introduces a Bayesian-Nash behavior between partially informed supervisors which reduces the total collusive offers they make. As a result, the transaction costs of collusive activities increase and preventing collusion becomes easier. Separation improves social welfare.

Boyer and Ponce (2012) adapt this framework to analyze the implications of capture on the optimal allocation of micro and macro prudential supervision. They conclude that concentration of both supervisory powers in one agency could be harmful because the monopoly of information acquisition may be a curse when capture is a concern. In other words, institutional separation of the micro- and the macro-pillar of supervision now offers a unique opportunity to create a system of checks and balances that should have a positive impact on the incentive structure of supervisors and – provided both agencies have good governance arrangements – would enhance effectiveness and responsiveness of supervision.

An effective architecture from a supervisory governance point of view would therefore be to house macro prudential supervision in the central bank and micro prudential supervision in an agency at arms' length from the central bank. The advantages of this architecture would be that (i) it provides checks and balances that would better align supervisors' incentives; (ii) not all power is concentrated in one mega-agency. So the separation of the two sides of supervision can be used to reduce the fear of too much central bank involvement (or dominance); (iii) synergies are created because the analytical scope of macro prudential supervision is closer to the core focus of the central bank; (iv) the link between macro-prudential supervision and the central bank's function of liquidity provisioning be

preserved; and (v) if central banks are not involved in micro prudential supervision the classical moral hazard risk (banks become less risk averse if the lender of last resort function is also with the supervisor) becomes weaker.

The proposed division of labor would also entail some costs in terms of reporting to two agencies and the need for coordination and communication between these agencies. Finally, these arrangements could potentially introduce some competition among supervisors but since their mandates would be different it would not be the type of competition that financial institutions could exploit. In any case, the models on which this proposal is founded indicate that these costs are lower than the potential benefits.

Governance of the oversight framework can be further strengthened by resorting, in some critical areas, to a more rule-based system, such as PCA. This is all the more true for macro-prudential area. While micro prudential supervision traditionally has had to cope with various forms of capture, this is much truer with macro prudential supervision which will have to cope with a wide variety of the political economy constraints. While it might be challenging to close a bank when there is political pressure, it will be all the more difficult to "take away the punch bowl" when politicians and the industry only see the advantages of certain booms. For an overview of pros and cons of rules based decision-frameworks, see e.g. Agur and Sharma (2013).

8.8. CONCLUSIONS

> Banking supervision is an art, not a science. It cannot be, and should not be failsafe. (…). But it is up to the supervisory community itself to understand and to articulate the objectives and limitations of the supervisory process. To the extent that the supervisory community does this well, it will flourish in the sunshine of its heightened public profile.
>
> G. Corrigan (1992)

Bank supervision is a crucial and essential complement to bank regulation in the authorities' pursuit of financial stability. Yet, as this overview has shown, the grand debates about key features of supervision aimed at making it more effective, have not yielded clear conclusions in any specific direction. The empirical evidence is also inconclusive: supervision could be effective when housed in the central bank, or it could show failures. Consolidating all supervisory agencies under one roof might be good, but at the next crisis, it might be blamed for not having been effective. Financial crises occur in countries that have a high degree of supervisory independence, while in countries with lower independence, supervisors might be hailed for having prevented a crisis.

Will the Holy Grail for effective supervision ever be found? Probably not. Supervision will probably never be failsafe – and, in line with Goodhart, we say that it should not be. Supervisors will always find themselves between Scylla and Charybdis, but the economics profession and policymakers need to continue the search to improve supervisory effectiveness. In order to do that, any misconception about supervision and its role needs to be wiped out, and its limitations need to be clearly pointed out.

The misconception, which lives with the broad public and politicians alike, is that supervisors should avoid any bank failure. A bank failure is not tantamount to supervisory failure. It can even be good for the system that a bank fails, as long as the soundness of the system improves as a result of that. When faced with a crisis, politicians reveal often the same instincts: the existing supervision and regulation is at fault and heads must roll. And, as Goodhart (2007) says "since politicians do not want it to be their own heads that become parted from their bodies, they feel the need to be seen to be taking actions to make sure that that particular disaster never happens again" (witness for instance the number of reversals in changes in supervisory architecture in the wake of the global crisis).

In order to get rid of this misconception it is important to understand and point out the limitations of supervision. First, in a world of "prudential regulations" as opposed to "prohibitive regulations", supervisors have more a monitoring (supervising) function than a strictly controlling function. However, if they cannot strictly control financial institutions, the implication is that they can ultimately not be held responsible for an institution's behavior, but that the final responsibility lies with the corporate governance of the financial institutions.

Secondly, the supervisors' mandate can never be perfectly defined and measurable. This means that their contract (in the principal-agent sense) will always be incomplete because of the wide range of contingencies in the execution of their mandate. So, simple accountability will not work. Supervisors should be considered "fiduciaries" whose duties are defined by relational contracting whereby the parties do not agree on a detailed plan of action, but on general principles and procedures, on types of actions to be taken and instruments to be used. Such a relationship requires multiple accountability arrangements to create trust.

Once these limitations have been understood, supervision can be organized in a way that it can work effectively within these boundaries. The new paradigm that has emerged after the crisis offers a great opportunity in this context: if macro- and micro-prudential supervision are housed in a different agency (or, if that is not possible, with strict "Chinese walls" between the operations and the decision-making of both), both agencies should be endowed with strong governance arrangements. Relying on a set of rules, rather than full discretion in some parts of the decision making process should be part of these governance arrangements.

The arguments for resorting to some rules are even stronger in macro-prudential supervision in light of the political economy pressures on this policy domain.

In such a constellation, there would be a system of checks and balances between both agencies, because they analyze and monitor the same subject matter, but from different angles. Such checks and balances would go a long way in reducing the risks of political, industry and self-capture. At the same time, they offer the opportunity for better supervisory effectiveness within the limitations that we outlined above. This could be an important step forward in our search for the Holy Grail.

REFERENCES

ABRAMS, R.K. and TAYLOR, M.W., 2002, "Assessing the Case for Unified Sector Supervision", *Financial Markets Group Special Papers*, No. 134, FMG, LSE, London.

ABRAMS, R.K. and TAYLOR, M.W., 2000, "Issues in the Unification of Financial Sector Supervision", *IMF Working Paper* 00/213, Washington, International Monetary Fund.

AGUR, I. and SHARMA, S., 2013, "Rules, Discretion and Macro-Prudential Policy", *IMF Working Paper* 13/65, Washington, International Monetary Fund.

ALESINA, A. and TABELLINI, G., 2003, "Bureaucrats or Politicians?", Harvard Institute of Economic Research, Discussion Paper, No. 2009.

ALLEN, F. and CARLETTI, E., 2009, "The Global Financial Crisis: Causes and Consequences" (mimeo).

ANGELINI, P., NERI, S. and PANETTA, F., 2012, "Monetary and Macroprudential Policies", *Working Paper Series*, No. 1449, European Central Bank.

APINIS, M., BODZIOCH, M., CSONGRADI, E., FILIPOVA, T., FOIT, Z., KOTKAS, J., PORZYCKI, M. and VETRAK, M., 2010, "The Role of National Central Banks in Banking Supervision" in *Selected Central and Eastern European Countries*, Legal Working Paper Series, No. 11, European Central Bank.

ARNONE, M. and GAMBINI, A., 2007, "Architecture of Supervisory Authorities and Banking Supervision" in *Designing Financial Supervision Institutions: Independence, Accountability and Governance*, Cheltenham, UK, Edward Elgar, pp. 262-308, ed. by MASCIANDARO, D. and QUINTYN, M.

AYDIN, B. and VOLKAN, E., 2011, "Incorporating Financial Stability in Inflation Targeting Frameworks", *IMF Working Paper* 11/224, Washington, International Monetary Fund.

BARTH, J.R., CAPRIO, G. and LEVINE, R., 2006, *Rethinking Bank Supervision and Regulation: Till Angels Govern*, Cambridge, UK, Cambridge University Press.

BARTH, J.R., CAPRIO, G. and LEVINE, R., 2004, "Bank regulation and supervision: What works best?" *Journal of Financial Intermediation*, Vol. 117 (13), pp. 205-248.

BARTH, J.R., CAPRIO, G. and LEVINE, R., 2001, "The Regulation and Supervision of Banks Around the World: A New Database" in *Integrating Emerging Market Countries into the Global Financial System*, R.E. LITAN and R. HERRING, Brookings-Wharton Papers on Financial Services, Brookings Institution Press.

BARTH, J.R., NOLLE, D.E.M., PHUMIWASANA, T. and YAGO, G., 2002, "A Cross Country Analysis of the Bank Supervisory Framework and Bank Performance", *Financial Markets*, Institutions & Instruments, Vol. 12, No. 2, pp. 67-120.

BASEL COMMITTEE ON BANKING SUPERVISION, 1997, *Core Principles for Effective Banking Supervision*, Basel, Bank for International Settlements.

BEAN, C., 2011, *Central Banking Then and Now*, Sir Leslie Melville Lecture, Australian National University, Canberra (mimeo).

BECK, T., DEMIRGÜÇ-KUNT, A. and LEVINE, R., 2001, "A New Database on Financial Development and Structure", *World Bank Economic Review*, Vol. 14 (3), pp. 597-605.

BECK, T., DEMIRGÜÇ-KUNT, A. and LEVINE, R., 2002, "Law, Endowments and Finance", *NBER Working Paper*, No. 9089, Cambridge, Massachusetts: National Bureau of Economic Research.

BECK, T., DEMIRGÜÇ-KUNT, A. and LEVINE, R., 2003, "Bank Supervision and Corporate Finance", *NBER Working Paper*, No. 9620, Cambridge, Massachusetts, National Bureau of Economic Research.

BENSTON, G., EISENBEIS, R., HORVITZ, P., KANE, E. and KAUFMAN, G., 1986, *Perspectives on Safe and Sound Banking: Past, Present and Future*, Cambridge, MA, MIT Press.

BENSTON, G. and KAUFMAN, G., 1988, "Risk and Solvency Regulation of Depository Institutions: Past Policies and Current Options", Federal Reserve Bank of Chicago, Staff Memorandum, No. 88-1, pp. 1-67.

BENSTON, G. and KAUFMAN, G., 1997, "FDICIA after Five Years", *Journal of Economic Perspectives*, Vol. 11, No. 3. (Summer), pp. 139-158.

BERGER, H., 1997, "The Bundesbank's Path to Independence. Evidence from the 1950s", *Public Choice*, No. 93, pp. 427-453.

BERNANKE, B., 2011, "The Effect of the Great Recession on Central Bank Doctrine and Practice", *Board of Governors of the Federal Reserve System* (mimeo).

BLANCHARD, O., DELL'ARICCIA, G. and MAURO, P., 2010, "Rethinking Macroeconomic Policy", *IMF Staff Position Note*, SPN/10/03.

BLINDER, A., 2010, "How Central Should the Central Bank Be", *Journal of Economic Literature*, Vol. 48 (1), pp. 123-133.

BOOT, A. and THAKOR, A., 1993, "Self-Interested Bank Regulation", *American Economic Review*, Vol. 83, No. 2 (May), pp. 206-212.

BORDO, M., 2011, "Long Term Perspectives on Central Banking" in *What is a Useful Central Bank?*, ed. by A. BERG *et al.*, Norges Banks Occasional Papers, No. 42.

BORIO, C., 2007, "Monetary and Prudential Policies at the Crossroads: New Challenges in the New Century", *BIS Working Papers*, No. 216.

BORIO, C., 2011, "Central Banking Post-Crisis: What Compass for Uncharted Waters?", *BIS Working Papers*, No. 353.

BOYER, P.C. and PONCE, J., 2011a, "Central banks and banking supervision reform", ed. by S. EIJFFINGER and D. MASCIANDARO in *The Handbook of Central Banking*, Financial Regulation and Supervision after the Crisis, Cheltenham, UK, Edward Elgar.

BOYER, P.C. and PONCE, J., 2011b, "Regulatory Capture and Banking Supervision Reform", *Journal of Financial Stability*, Vol. 8, pp. 206-217.

BRIAULT, C., 1999, "The Rationale for a Single National Financial Services Regulator", *FSA Occasional Paper*.

BRIAULT, C., 2002, "Revisiting the Rationale for a Single National Financial Services Regulator", *FMG Special Paper*, No. 135, London, LSE.

BRUNNERMEIER, M., CROCKETT, A., GOODHART, C., HELLWIG, M., PERSAUD, A. and SHIN, H., 2009, "The Fundamental Principles of Financial Regulation", *Geneva Reports on the World Economy*, No. 11.

BUITER, W., 2008, "Lessons from the North Atlantic Financial Crisis", paper presented at the conference, "The Role of Money Markets", Columbia Business School and Federal Reserve Bank of New York, May 29-30.

CAGLIARINI, A., KENT, C. and STEVENS, G., 2010, "Fifty Years of Monetary Policy: What Have We Learned?" in 50th Anniversary Symposium, Conference Volume, ed. by C. KENT and M. ROBSON, Reserve Bank of Australia.

CAPRIO, G., D'APICE, V., FERRI, G. and PUOPOLO, G.W., 2010, "Macro Financial Determinants of the Great Financial Crisis: Implications for Financial Regulation", *MPRA Paper*, No. 26088. Available via the Internet: http://ssrn.com/abstract=1788063.

CECCHETTI, S., 2008, "The Subprime Series, Part 3: Why Central Banks Should Be Financial Supervisors" in *The First Global Financial Crisis in the 21st Century*, ed. by A. FELTON and C. REINHART, VoxEU.org Publication, CERP.

ČIHÁK, M. and PODPIERA, R., 2007, "Experience with Integrated Supervisors: Governance and Quality of Supervision", ed. by MASCIANDARO, D. and QUINTYN, M. in *Designing Financial Supervision Institutions: Independence, Accountability and Governance*, pp. 309-341, Cheltenham, U.K., Edward Elgar.

CORRIGAN, G, 1992, "Challenges facing the International Community of Bank Supervisors", *FRBNY Quarterly Review* (Autumn), Vol. 17, Issue 3, pp. 1-9.

CROCKETT, A., 2010, "Central Bank Governance under New Mandates", *BIS Papers*, No. 55.

CUKIERMAN, A., 2008, "Central Bank Independence and Monetary Policymaking Institutions: Past, Present and Future", *European Journal of Political Economy*, No. 24, pp. 722-736.

CUKIERMAN, A., 2012, "Monetary Policy and Institutions Before, During and After the Global Financial Crisis", *Paolo Baffi Centre Research Paper Series*, No. 118, Bocconi University.

DALE, R., 1997, "Reorganizing the Regulation Industry", *Financial Regulation Report*, No. 2.

DALLA, PELLEGRINA, L., MASCIANDARO, D. and PANSINI, R.V., 2012, "Do Exchange Rate Regimes Affect the Role of Central Banks as Banking Supervisors?", *European Journal of Law and Economics* (forthcoming).

DALLA, PELLEGRINA, L., MASCIANDARO, D. and PANSINI, R.V., 2011, "New Advantages of Tying One's Hand: Banking Supervision, Monetary Policy and Central Bank Independence", ed. by S. EIJFFINGER and D. MASCIANDARO in *The Handbook of Central Banking, Financial Regulation and Supervision after the Crisis*, Cheltenham, U.K., Edward Elgar.

DAS, U. and QUINTYN, M., 2002, "Financial Crisis Prevention and Crisis Management: The Role of Regulatory Governance" in *Financial Sector Governance: The Roles of the Public and Private Sectors*, ed. by R. LITAN, M. POMERLEANO and V. SUNDARARAJAN, Washington, Brookings Institution Press.

DE GRAEVE, F., KICK, T. and KOETTER, M., 2008, "Monetary Policy and Financial (In)stability: An Integrated Micro-Macro Approach", *Journal of Financial Stability*, Vol. 4 (3), pp. 205-231.

DE HAAN, J., MASCIANDARO, D. and QUINTYN, M., 2008, "Does Central Bank Independence Still Matter?", *European Journal of Political Economy*, Vol. 24, pp. 717-721.

DE LAROSIÈRE GROUP, 2009, *Report of the High Level Group on Financial Supervision*.

DE LUNA, M., ROSE, J. and T., 2003, "International Survey of Integrated Supervision", pp. 3-39 in *Financial Regulation. A guide to Structural Reform*, ed. by D. ARNER and J.-J. LIN, Thomson-Sweet and Maxwell Asia.

DERMINE, J. and SCHOENMAKER, D., 2010, "In Banking, Is Small Beautiful?", *DSF Policy Paper*, No. 2, Duisenberg School of Finance (January).

DEWATRIPONT, M. and TIROLE, J., 1994, *The Prudential Regulation of Banks*, Cambridge, Massachusetts, The MIT Press.

DIAZ-ALEJANDRO, C., 1985, "Good-bye Financial Repression, Hello Financial Crash", *Journal of Development Economics*, Vol. 19.

DI GIORGIO, G. and DI NOIA, C., 2003, "Financial Market Regulation and Supervision: How Many Peaks for the Euro Area?" *Brooklyn Journal of International Law*, No. 28, pp. 463-493.

DI GIORGIO, G. and DI NOIA, C., 1999, "Should Banking Supervision and Monetary Policy Tasks be given to Different Agencies?" *International Finance*, Vol. 3.

DIJKSTRA, R., 2010, "Accountability of financial supervisory agencies: An Incentive Approach", *Journal of Banking Regulation*, Vol. 11, pp. 115-128.

DJANKOV, S., LA PORTA, R., LOPEZ-DE SILANES, F. and SHLEIFER, A., 2002, "The regulation of Entry", *Quarterly Journal of Economics*, No. 117 (1), pp. 1-37.

EICHENGREEN, B. and DINCER, N., 2011, "Who Should Supervise? The Structure of Bank Supervision and the Performance of the Financial System", *NBER Working Paper*, No. 17401, National Bureau of Economic Research.

EIJFFINGER, S.C.W., 2001, "Should the European Central Bank Be Entrusted with Banking Supervision in Europe", *Briefing Paper on "The Conduct of Monetary Policy and an Evaluation of the Economic Situation in Europe"*, Brussels, European Parliament.

EIJFFINGER, S. and MASCIANDARO, D., 2011, "Introduction", ed. by S. EIJFFINGER and D. MASCIANDARO in *Handbook of Central Banking, Financial Regulation and Supervision after the Crisis*, Cheltenham, U.K., Edward Elgar.

EUROPEAN CENTRAL BANK, 2002, "The Role of Central Banks in Prudential Supervision", Available via Internet www.ech.int.

EUROPEAN CENTRAL BANK, 2003, *Developments in National Supervisory Structures* (mimeo).

EUROPEAN COMMISSION, 2000, *Institutional Arrangements for the Regulation and Supervision of the Financial Sector* (mimeo).

FENDER, I. and VON HAGEN, J., 1998, *Central Bank Policy in a More Perfect Financial System*, ZEI Policy Paper.

FINANCIAL SERVICES AUTHORITY (FSA), 2009, "The Turner Review. A Regulatory Response to the Global Banking Crisis", FSA, London (March).

GARDENER, E., 1986, *UK Banking Supervision: Evolution, Practice and Issues* ed. by ALLEN and UNWIN, London.

GERLACH, S., GIOVANNINI, A., TILLE, C. and VINALS, J., 2009, "Are the Golden Days of Banking Over? The Crisis and the Challenges", *Geneva Reports on the World Economy*, No. 10.

GERSBACH, H., 2011, "A Framework for Two Macro Policy Instruments: Money and Banking Combined", *CEPR Policy Insight*, No. 58.

GOODHART, C., 1995, "Some Regulatory Concerns", London School of Economics, Financial Market Group Special Paper, Vol. 79 (December).

GOODHART, C., 2000, "The Organisational Structure of Banking Supervision", *Special Paper*, No. 127, London School of Economics, Financial Market Group, London.

GOODHART, C., 2001, "Regulating the Regulators: Accountability and Control" in *Regulating Financial Services and Markets in the 21st Century*, ed. by FERRAN and GOODHART, Oxford, Hart Publishing.

GOODHART, C., 2002, "The Organizational Structure of Banking Supervision", *Economic Notes by Banca Monte dei Paschi di Siena*, Vol. 31, No. 1, pp. 1-32.

GOODHART, C., 2007, "Financial Supervision from a Historical Perspective: Was the Development of such Supervision Designed, or Largely Accidental?" in *The Structure of Financial Regulation*, ed. by ROOTLEDGE, D. WOOD, M. and G.

GOODHART, C., 2010, "The Changing Role of Central Banks", *BIS Working Papers*, No. 326.

GOODHART, C., 2011a, "Global Macroeconomic and Financial Supervision: Where Next?", *NBER Working Paper*, No. 17682, National Bureau of Economic Research.

GOODHART, C., 2011b, "The Macro-Prudential Authority: Powers, Scope and Accountability", *OECD Journal: Financial Market Trends*, Vol. 2011/2.

GOODHART, C., HARTMANN, P., LLEWELLYN, D., ROJAS-SUAREZ, L. and WEISBROAD, S., 1998, *Financial Regulation. Why, how and where now?*, Routledge, London and New York.

GOODHART, C.A.E., OSORIO, C. and TSOMOCOS, D.P., 2009, "Analysis of Monetary Policy and Financial Stability: A New Paradigm", *CESifo Working Paper Series*, No. 2885.

GOODHART, C. and SCHOENMAKER, D., 1995a, "Institutional Separation between Supervisory and Monetary Agencies" in *The Central Bank and the Financial System*, ed. by C. GOODHART, Cambridge, Mass: MIT Press.

GOODHART, C. and SCHOENMAKER, D., 1995b, "Should the Functions of Monetary Policy and Banking Supervision be Separated?", *Oxford Economic Papers*, No. 47, pp. 539-560.

GOODHART, C., SCHOENMAKER, D. and DASGUPTA, P., 2002, "The Skill Profile of Central Bank and Supervisors", *European Finance Review*, No. 6, pp. 539-560.

GRÜNBICHLER, A. and DARLAP, P., 2003, *Integration of European Supervisory Systems: Harmonisation or Unification?* (mimeo).

HALL, M., 1993, *Handbook of Banking Regulation and Supervision*, Woodhead-Faulkner.

HAUBRICH, J.G., 1996, "Combining Bank Supervision and Monetary Policy", *Economic Commentary*, Federal Reserve Bank of Cleveland (November).

HAWKESBY, C., 2000, "The Institutional Structure of Financial Supervision: A Cost Benefit Analysis", *The Journal of International Banking Regulation* (July), pp. 36-54.

HERRING, R.J. and CARMASSI, J., 2008, "The Structure of Cross-Sector Financial Supervision", *Financial Markets, Institutions and Instruments*, Vol. 17, No. 1, pp. 51-76.

HIRSCHMAN, A.O., 1964, "The Paternity of an Index", *American Economic Review*, Vol. 54, No. 5, pp. 761-762.

HÜPKES, E., QUINTYN, M. and TAYLOR, M., 2005, "The Accountability of Financial Sector Supervisors: Theory and Practice", *European Business Law Review*, Vol. 16, No. 6, pp. 1575-1620.

HUSSAIN, B., 2009, "Integrated Financial Supervision and its Implications for Banking Sector Stability", Stern School of Business, New York University (mimeo).

IOANNIDOU, V. P., 2005, "Does Monetary Policy affect the Central Bank's Role in Bank Supervision?", *Journal of Financial Intermediation*, Vol. 14, pp. 58-85.

ITO, T., 2010, "Monetary Policy and Financial Stability: Is Inflation Targeting Passé?", *ADB Economics Working Paper Series*, No. 206, Asian Development Bank, Manila.

KAHN, C.M. and SANTOS, J.A.C., 2001, "Allocating Bank Regulatory Powers: Lender of Last Resort, Deposit Insurance and Supervision", Monetary and Economic Department, *BIS Working Papers*, No. 102.

KANE, E., 1985, "The Gathering Crisis in Federal Deposit Insurance", Cambridge, MA, MIT Press.

KANE, E., 1989, "Changing Incentives Facing Financial Services Regulators", *Journal of Financial Services Research*, No. 2, pp. 265-274.

KANE, E., 1990, "Principal-Agent Problems in S&L Salvage", *Journal of Finance*, Vol. 45, July, pp. 755-764.

KAWAI, M. and MORGAN, P.J., 2012, "Central Banking for Financial Stability in Asia", *ADBI Working Paper Series*, Asian Development Bank Institute, No. 377.

KLOMP, J. and DE HAAN, J., 2010, "Central Bank Independence and Inflation Revisited", *Public Choice*, Vol. 144, pp. 445-357.

KLOMP, J. and DE HAAN, J., 2009, "Central Bank Independence and Financial Stability", *Journal of Financial Stability*, Vol. 5, pp. 321-338.

KREMERS, J., SCHOENMAKER, D. and WIERTS, P., 2003, "Cross Sector Supervision: Which Model?" in *Does the Future Belong to Financial Conglomerates?*, ed. by R. HERRING and R. LITAN, Brookings Institution, Washington DC.

KREMERS, J., SCHOENMAKER, D. and WIERTS, P., 2001, "Does Europe Need a Euro-Wide Supervisor?" *Financial Regulator*, No. 6, pp. 50-56.

LAEVEN, L. and VALENCIA, F., 2010, "Resolution of Banking Crises: the Good, the Bad and the Ugly", *IMF Working Paper* 10/146, Washington, International Monetary Fund.

LACOUE-LABARTHE, D., 2003, "L'Évolution de la Supervision Bancaire et de la Réglementation Prudentielle", *Revue d'Economie Financière*, Vol. 73, pp. 39-63.

LAFFONT, J.J. and MARTIMORT, D., 1999, "Separation of Regulators against Collusive Behavior", *RAND Journal of Economics*, Vol. 30, No. 2 (Summer), pp. 232-262.

LAMFALUSSY, A., 2010, "The Future of Central Banking under Post-Crisis Mandates", *BIS Papers*, No. 55.

LANNOO, K., 2000, *Challenges to the Structure of Financial Supervision in the EU*, 22nd SUERF Colloquium, Wien.

LASLETT, R. and TAYLOR, M., 1998, "Independence and Accountability: Tweaking the Financial Services Authority", Centre for the Study of Financial Innovation, London, *Working Group on Regulation Paper*, No. 3.

LEIJONHUFVUD, A., 2009, "Curbing Instability: Policy and Regulation", *CEPR Policy Insight*, No. 36 (July).

LINDGREN, C.J., BALINO, T., ENOCH, C. *et al.*, 1999, "Financial Sector Crisis and Restructuring-Lessons from Asia", *IMF Occasional Paper*, No. 188, Washington, International Monetary Fund.

LLEWELLYN, D., 1999, "Introduction: the Institutional Structure of Regulatory Agencies", in *How Countries Supervise Their Banks, Insurers and Securities Markets*, ed. by N. COURTIS, Central Bank Publication, London.

LLEWELLYN, D., 2006, "Integrated Agencies and the Role of Central Banks" in *Handbook of Central Banking and Financial Authorities in Europe*, ed. by D. MASCIANDARO, Cheltenham, U.K., Edward Elgar.

MAJONE, G., 2005, "Strategy and Structure: The Political Economy of Agency Independence and Accountability", in *Designing Independent and Accountable Regulatory Agencies for High Quality Regulation*, Proceedings of an Expert Meeting in London (January 10-11), Organization for Economic Cooperation and Development, pp. 126-55.

MASCIANDARO, D., 2006, "E Pluribus Unum? Authorities Design in Financial Supervision: Trends and Determinants", *Open Economies Review*, Vol. 17 (1), pp. 73-102.

MASCIANDARO, D., 2007, "Divide et Impera: Financial Supervision Unification and Central Bank Fragmentation Effect", *European Journal of Political Economy*, Vol. 23, No. 2 (June), pp. 285-315.

MASCIANDARO, D., 2008, "Unification in Financial Sector Supervision: the Trade Off Between Central Bank and Single Authority", *Journal of Financial Regulation and Compliance*, Vol. 12, No. 2.

MASCIANDARO, D., 2009, "Politicians and Financial Supervision outside the Central Bank: Why Do They Do it?" *Journal of Financial Stability*, Vol. 5, No. 2, pp. 124-147.

MASCIANDARO, D., 2012, "Back to the Future? Central Banks as Prudential Supervisors in the Aftermath of the Crisis", *European Company and Financial Law Review*, Vol. 12, No. 2, pp. 112-130.

MASCIANDARO, D., PANSINI, R.V. and QUINTYN, M., 2013, "The Economic Crisis: Did Financial Supervision Matter?" *Journal of Financial Stability*, (forthcoming).

MASCIANDARO, D. (Ed.) and PORTA, A., 2004, "Single Authority in Financial Market Supervision: Lessons for EU Enlargement" in *Financial Intermediation in the New Europe*, Cheltenham, U.K., Edward Elgar.

MASCIANDARO, D. and QUINTYN, M., 2008, "Helping Hand or Grabbing Hand? Politicians, Supervisory Regime, Financial Structure and Market View", *North American Journal of Economics and Finance*, pp. 153-174.

MASCIANDARO, D. and QUINTYN, M., 2009, "Reforming Financial Supervision and the Role of the Central Banks: A Review of Global Trends, Causes and Effects (1998-2008)", *CEPR Policy Insight*, Centre for Economic Policy Research, No. 30.

MASCIANDARO, D. and QUINTYN, M., 2011, "Who and How: Measuring the Financial Supervision Architectures and the Role of the Central Banks" in *The Financial Supervision Herfindahl Hirschman Index, Journal of Financial Transformation*, No. 32, pp. 9-14.

MASCIANDARO, D. and QUINTYN, M., 2012, "Supervisory Governance: Two is Better than one. Should Europe Reconsider its options?" *VoxEU*

MASCIANDARO, D., QUINTYN, M. and TAYLOR, M.W., 2008, "Inside and outside the central bank: Independence and Accountability in Financial Supervision: Trends and Determinants", *European Journal of Political Economy*, Vol. 24, No. 4, pp. 833-848.

MASCIANDARO, D., QUINTYN, M. and TAYLOR, M.W., 2010, "Independence and Accountability in Supervision: Comparing Central Banks and Financial Authorities", in *Challenges in Central Banking. The Current Institutional Environment and Forces Affecting Monetary Policy*, ed. by SIKLOS, BOHL and WOHAR, Cambridge University Press.

MAYES, D., NIETO, M. and WALL, L., 2008, "Multiple Safety Net Regulators and Agency Problems in the EU: Is Prompt Corrective Action part of the solution?", *Journal of Financial Stability*, Vol. 4, No. 3, pp. 232-257.

MCKINNON, R.I., 1993, *The Order of Economic Liberalization: Financial Control in the Transition to a Market Economy*, Baltimore, Johns Hopkins University Press.

NIER, E.W., 2009, "Financial Stability Frameworks and the Role of Central Banks: Lessons from the Crisis", *IMF Working Paper* 09/70, Washington, International Monetary Fund.

NIER, E., JÁCOME, L., OSI SKI, J. and MADRID, P., 2011b, "Institutional Models for Macroprudential Policy", *IMF Staff Discussion Notes* 11/18, Washington, International Monetary Fund.

NIER, E., OSI SKI, J., JÁCOME, L. and MADRID, P., 2011a, "Towards Effective Macroprudential Policy Frameworks: An Assessment of Stylized Institutional Models", *IMF Working Paper* 11/250, Washington: International Monetary Fund.

NIETO, M. and WALL, L., 2007, "Prompt Corrective Action: Is There a Case for an International Banking Standard?", Chapter 23 in D. Evanoff, G. KAUFMAN and J. LA BROSSE, (Eds.), *International Financial Instability: Global Banking and National Regulation, World Scientific Studies in International Economics*, Vol. 2.

OOSTERLOO, S. and DE HAAN, J., 2004, "Central Banks and Financial Stability: a Survey", *Journal of Financial Stability*, Vol. 1 (2), pp. 257-273.

ORITANI, Y., 2010, "Public Governance of Central Banks: An Approach from New Institutional Economics", *BIS Working Papers*, No. 299, Bank for International Settlements.

PADOA SCHIOPPA, T., 2003, "Financial Supervision: Inside or Outside the Central Banks?" ed. by KREMERS, J., SCHOENMAKER, D. and WIERTS, P. in *Financial Supervision in Europe*, pp. 160-175, Cheltenham, U.K., Edward Elgar.

PALMER, J. and CERRUTI, C., 2009, *Is there a need to rethink the supervisory process?*, Paper presented at the International Conference "Reforming Financial Regulation and Supervision: Going back to Basics", Madrid, June 15.

PAPADEMOS, L., 2010, "Central Bank Mandates and Governance Arrangements", *BIS Papers*, No. 55.

PEEK, J., ROSENGREN, E.S. and TOOTLE, G.M.B., 1999, "Is Bank Supervision Central to Central Banking?", *The Quarterly Journal of Economics*, No. 64, pp. 629-653.

PONCE, J., 2009, "A Normative Analysis of Banking Supervision: Independence, Legal Protection and Accountability", *Paolo Baffi Centre Research Paper*, No. 2009-48. Available at SSRN.

PRATI, A. and SCHINASI, G., 1999, "Financial Stability in European Economic and Monetary Union", *Princeton Studies in International Finance*, No. 86.

QUINTYN, M., 2007, "Governance of Financial Supervisors and its Effects – A Stocktaking Exercise", *SUERF Studies* 2007/4, 64 pp.

QUINTYN, M., 2009, "Principles versus Rules in Financial Supervision – Is there one Superior Approach?" in *Q Finance, The Ultimate Resource*, edited by Bloomsbury Information Ltd, pp. 353 -356, Qatar.

QUINTYN, M. and TAYLOR, M., 2003, "Regulatory and Supervisory Independence and Financial Stability", *CESifo*, Economic Studies, Vol. 49, No. 2, pp. 259-94.

QUINTYN, M. and TAYLOR, M., 2007, "Robust Regulators and their Political Masters: Independence and Accountability in Theory", Chapter 1 in *Designing Financial Supervision Institutions: Independence, Accountability and Governance*, ed. by D. MASCIANDARO and M. QUINTYN, Cheltenham, U.K., Edward Elgar.

QUINTYN, M., RAMIREZ, S. and TAYLOR, M.W., 2007, "The Fear of Freedom. Politicians and the Independence and Accountability of Financial Supervisors" in *Designing Financial Supervision Institutions: Independence, Accountability and Governance*, ed. by MASCIANDARO, D. and QUINTYN, M., Cheltenham, U.K., Edward Elgar.

RANDALL, R., 1993, "Lessons from New England Bank Failures", *New England Economic Review*, Federal Reserve Bank of Boston, May-June, pp. 13-38.

ROCHET, J.C., 2003, "Why are there so many banking crises?", *CESIfo Economic Studies*, Vol. 49, No. 2, pp. 141-155.

ROCHET, J.C., 2004, "Macroeconomic Shocks and Banking Supervision", *Journal of Financial Stability*, Vol. 1 (1), pp. 93-110.

ROUBINI, N., 2008, "Ten Fundamental Issues in Reforming Financial Regulation and Supervision in a World of Financial Innovation and Globalization", *RGE Monitor*.

SHAW, E.S., 1973, *Financial Deepening in Economic Development*, New York, Oxford University Press.

SCHOENMAKER, D., 2003, "Financial Supervision: from National to European?", *Financiele & Monetaire Studies*.

SCHULER, M., 2003, "Incentive Problems in Banking Supervision – The European Case", *Centre for European Economic Research*, Discussion Paper, No. 03/62.

SVENSSON, L., 2010, "Inflation Targeting after the Financial Crisis, Challenges to Central Banking", *Reserve Bank of India Conference* (mimeo).

TABELLINI, G., 2008, "Why did bank supervision fail?" in *The First Global Financial Crisis in the 21st Century – A VoxEU.org Publication*, ed. by A. FELTON and C. REINHART, CERP.

TAYLOR, J., 2010, "Macroeconomic Lessons from the Great Deviation", *25th NBER Macro Annual Meeting* (mimeo).

TAYLOR, M., 1995, *Twin Peaks: A Regulatory Structure for the New Century*, Centre for the Study of Financial Innovation, London.

TAYLOR, M., 1996, *Peak Practice*, London, Centre for the Study of Financial Innovation.

TAYLOR, M., 2010, "Welcome to Twin Peaks", *Central Banking Journal*, August 17.

TAYLOR, M. and FLEMING, A., 1999, "Integrated Financial Supervision. Lessons from Northern European Experience", *Policy Research Working Paper*, No. 2223, The World Bank.

TONIOLO, G., 2011, "What is a Useful Central Bank? Lessons from Interwar Years", in *What is a Useful Central Bank?*, ed. by A. BERG *et al.*, Norges Banks Occasional Papers, No. 42.

UEDA, K. and VALENCIA, F.V., 2012, "Central Bank Independence and Macro-Prudential Regulation", *IMF Working Paper* 12/101, Washington, International Monetary Fund.

UGOLINI, S., 2011, "What Do We Really Know About the Long Term Evolution of Central Banking?", *Norges Bank Working Paper Series*, No. 15.

VIÑALS, J., FIECHTER, J. *et al.*, 2010, "The Making of Good Supervision: Learning to Say 'No'", *IMF Staff Position*, Note SPN/10/08.

VIVES, X., 2001, "Restructuring Financial Regulation in the European Monetary Union", *Journal of Financial Services Research*, No. 19, pp. 57-82.

VLETTER-VAN DORT, H.M., 2011, "Some Challenges facing Central Banks as Supervising Authorities", *ECFR Conference*, Zurich (mimeo).

WALL, L.D. and EISENBEIS, R.A., 2000, "Financial Regulatory Structure and the Resolution of Conflicting Goals", *Journal of Financial Services Research*, No. 17, pp. 223-245.

WEDER DI MAURO, B., 2009, "The Dog that Didn't Bark", *The Economist*, October 1.

WOODFORD, M., 2012, "Inflation Targeting and Financial Stability", *NBER Working Paper Series*, No. 17967, National Bureau of Economic Research.

9. Fifty Years in the Evolution of Bank Business Models

David T. Llewellyn

9.1. Introduction

This chapter considers the evolution of bank business models over the past fifty years and in particular in the pre-and post-crisis period which were times of fundamental change in such models. In many respects, new business models became an integral part of the crisis scenario and to some extent changed the underlying economics of banking. The structure of the chapter is as follows. Section 9.2. considers the evolution of business models since the early 1990s with four sub-periods identified. Section 9.3. outlines the basic tenets of the "traditional model" of banking followed in Section 9.4. by a review of how business models changed in the period running up to the crisis. The post-crisis period is subdivided into two: the short term (Section 9.5.) and medium term (Section 9.6.). Section 9.7. concludes.

9.2. The Nature and Evolution of Business Models

Bank business models are not static but evolve over time and under the influence of a complex mix of exogenous and endogenous pressures. The more powerful of these pressures include: the structural evolution and internationalisation of the financial system and financial markets; the macro-economic environment in which banks and their customers operate; the decisive impact of EU and national regulation; the competitive environment in banking markets; financial innovation; the impact of technology, and the chosen business objectives of banks (e.g. asset growth, market share, rate of return on equity (ROE), etc).

All of these featured as central aspects of the banking crisis (Llewellyn (2010)). With respect to regulation, it is evidently the case that detailed rules at the time did not prevent the crisis and, as argued elsewhere (Llewellyn (2011)), created incentives to change business models in a way that contributed to the crisis. The impact on business models of regulation, and the incentive structures it creates, can be seen in the Basel capital arrangements which created incentives for banks to, *inter alia,* move assets off the balance sheet, to increase their gearing levels, to securitise assets and create various forms of Special Purpose Vehicles (SPVs) and Structured Investment Vehicles (SIVs) to facilitate this, and to make increasing

use of credit risk-shifting instruments and derivatives. It is argued below that there is a two-way causation between regulation and bank business models: the *endogeneity problem* (Llewellyn (2011 and 2013)). This implies a symbiotic relationship between regulation and bank business models: business models respond to regulation which in turn responds to the evolution of new business models.

9.2.1. Bank Business Models

The chapter adopts a particular concept of "business models" which might offend management science purists. For purposes of our analysis, it has five core components: (1) the range of business undertaken (e.g. bank-assurance, securitisation and derivatives trading, etc.), (2) the banks' ultimate business objectives, (3) balance sheet management including funding, gearing and liquidity strategies, (4) the way the core intermediation business of banks is conducted (e.g. securitisation, use of credit risk-shifting instruments, etc), and (5) the management of regulation and in particular how banks respond to regulation through, for instance, regulatory arbitrage. We find that all of these changed (in some cases radically) in the pre-crisis period, and are likely to change again in the post-crisis environment. The concept of business models in this chapter relates to the range of business undertaken, and how the core financial intermediation business is conducted.

Over the years, several SUERF colloquia and publications have discussed various aspects of bank business models. For instance, several authors (including Vander Vennet, Benink, Sijben, Gardener and Molyneux) consider different aspects of the topic (such as the implications of the Single Market Programme, new entrants into banking, internationalisation, and mergers and acquisitions) in the colloquium volume (Gardener *et al.* (2002)). More specifically, several papers in the colloquium volume (edited by Balling *et al.* (2003)) addressed the issue of how technology has played a major role in the evolution of business models in banking including how new IT and communications technology, electronic payments and trading platforms have influenced the development of bank business models. In a later colloquium volume (Balling *et al.* (2006)), several authors (*inter alia*, Canals, Santomero, Santiago Carbo Valverde, Boonstra and Dermine) offer useful insights into issues such as the range of business undertaken by banks, balance sheet management, intermediation business, and problems associated with compliance with regulation.

Although there can be no precision in identifying specific turning points in the evolution of bank business models, for purposes of exposition and analysis four sub-periods are identified: (1) the "traditional" model of banking in the period from the early 1960s to the early part of the 21st century, (2) the immediate pre-crisis period from around 2000 to 2007, (3) the years immediately following the

crisis period, and (4) a medium-term post-crisis period. The dates for locating (3) and (4) are necessarily uncertain.

In the discussion of the post-crisis period, a distinction is made below between what might be termed the *stock-adjustment* effect (as banks adjust to the new banking and regulatory environment) and the new steady-state regime after the adjustment has been completed. The essence of the distinction is that how banks behave in the transitory stock-adjustment phase does not in itself indicate how they are likely to behave in a new steady-state regime. Behaviour during the period of moving towards new business models or regulatory regimes is likely to be different from when the new steady-state has been achieved and the adjustment has been made. For instance, the costs of moving from low to higher capital requirements are likely to be higher than the costs in the new steady-state position and after the adjustment has been made.

9.2.2. Context of Structural Change

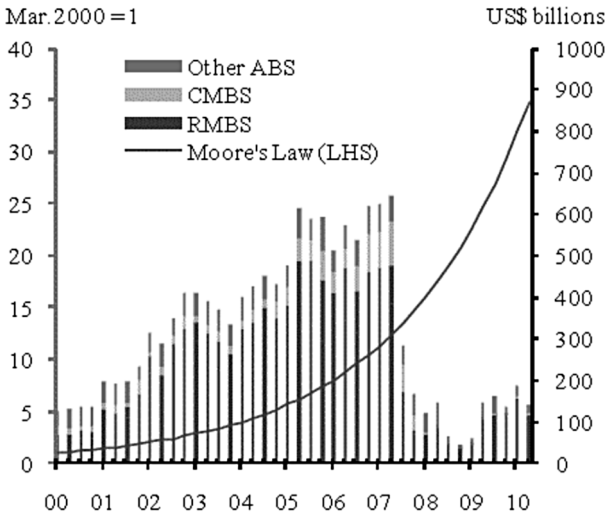
Our starting point is that the evolution of business models does not occur in a vacuum and the antecedents need to be considered. Several structural changes in the global financial system set the background to the emergence of new business models in the period preceding the crisis:

- a defining feature of the period was a strong development in quantitative financial theory in areas such as option pricing and portfolio theory with implications for the pace of financial innovation, and especially with respect to the emergence of credit derivatives designed to shift credit risk from loan originators (credit risk-shifting instruments). Figures 9.1 and 9.2 show the volumes of asset-backed securities and credit derivatives. A key distinction is that whilst the probability of the risk emerging when transactors use price derivatives is independent of the transaction (e.g. the buyer of a forward currency contract cannot influence the future exchange rate: the probability is exogenous to the transaction), banks are, to some extent, able to affect the outcome when they buy, for instance, credit default swaps as they may be induced to make bad loans and, to some extent, can influence the "credit event" that triggers payment in the contact (Llewellyn (2009a)). To some extent, therefore, the risk is partly endogenous to the bank in some credit risk-shifting instruments;
- a substantial rise in the volume of trading in complex, and sometimes opaque, derivatives contracts. The Bank for International Settlements (BIS) estimates that the outstanding value of Credit Default Swap (CDS) contracts rose to over USD 60 trillion immediately prior to the onset of the crisis;
- an increasing "financialisation" of economies (sharp growth in the value of financial assets and liabilities relative to GDP), and the role of banks in the

financial system and economy generally, and the volume of banks' trading in financial instruments;

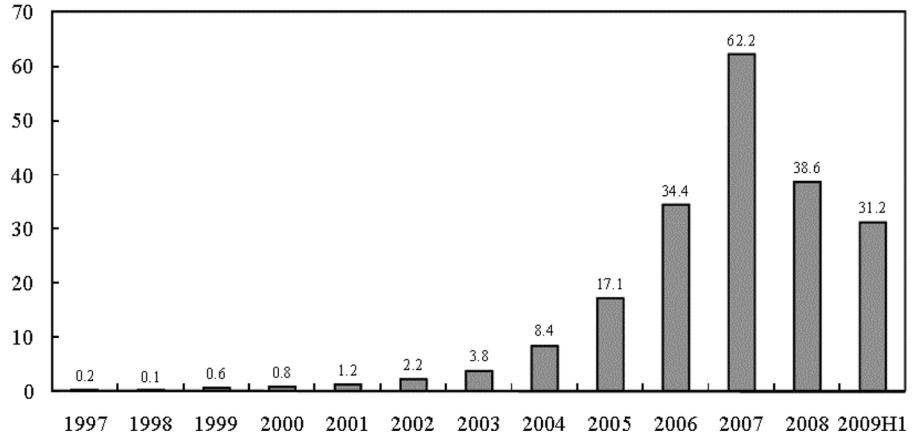
- a more market-centric structure of financial systems which implied a rise in the role of financial markets relative to institutions in the financial intermediation process. Furthermore, banks and markets became increasingly integrated (Boot and Thakor (2009)). One of the many implications of this trend was that losses incurred in markets could be translated into funding problems for banks. Furthermore, financial systems in general, and banks in particular, became more susceptible to shocks emanating in financial markets;
- a greater degree of inter-connectedness (both between banks and between banks and financial markets) and resultant network externalities (see Haldane (2009)). One implication of this is that shocks to any part of the network (either in banks or markets) have potentially powerful implications for the whole network;
- so-called (and largely unregulated) "shadow banks" (such as hedge funds and SIVs) emerged as significant new players in the financial intermediation process (Tett (2008 and 2009)). In effect, a shadow banking system emerged. As argued in Turner (2012), however, there were close and inextricable links between banks and "shadow banks";
- an increased globalisation of finance and financial markets. One of the features of the pre-crisis business model was a sharp rise in cross-border business (figures 9.3 and 9.4). The impact of globalisation was particularly powerful in the propagation of the crisis: what started as a local mortgage problem in parts of the US was generalised to a wide range of asset classes, to the interbank market, to several countries, and to several different types of financial institution;
- a sharp rise in gearing and leverage both by banks (including intra-financial sector gearing) and households;
- a substantial reduction in the holding of liquid assets by banks and an increased reliance on wholesale markets for liquidity and funding requirements;
- greater degrees of maturity transformation by banks;
- diversification of banks into different business areas with the result that they became increasingly similar to each other. Thus, while individual institutions diversified (which could be regarded as making them less risky through the spreading of different risks), the result was a less diversified system.

Figure 9.1: Global issuance of Asset-Backed Securities



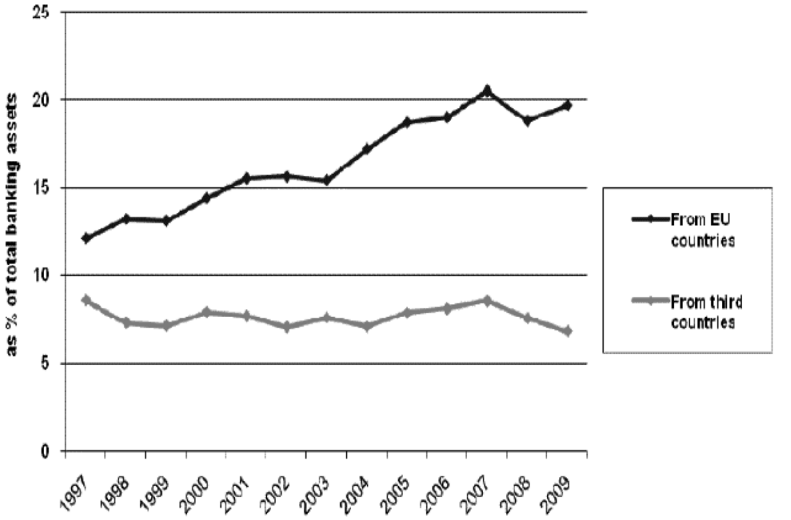
Source: Dealogic

Figure 9.2: Global credit derivatives outstanding (USD trillion)



Sources: BBA, BIS, ISDA and Risk Magazine

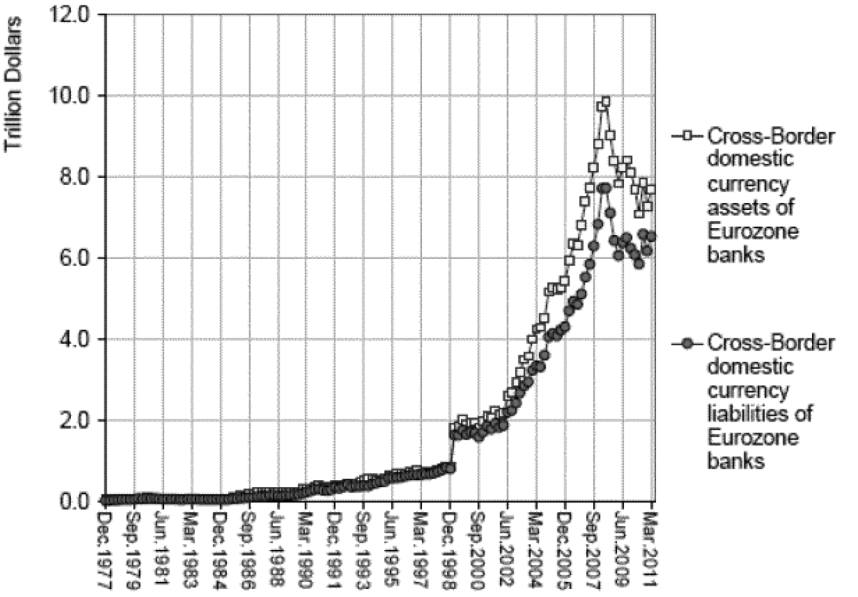
Figure 9.3: Share of cross-border banking assets in EU 1997-2009



Note: shows share of assets of non-domestic subsidiaries and branches relative to total banking assets. Measured for EU 27.

Source: Liikanen Report (2012)

Figure 9.4: Cross-border assets and liabilities of euro area banks 1977-2011



Source: Liikanen Report (2012); Shin (2012)

The emergence in particular of credit risk-shifting derivatives had several important properties with respect to bank business models, the distribution of credit risks, the generation of credit, and the structure of financial intermediation in the financial system. They also produced a more market-centric financial system. In particular, instruments designed to shift credit risk produced new banking models (*originate and distribute*, for example) that changed in a fundamental way the underlying economics of banking and also made the system potentially more crisis-prone (Llewellyn (2010)). The main feature was the emergence and sharp growth in credit risk-shifting instruments enabling credit risk to be shifted, traded, insured, and taken by institutions without the need for them to originate loans. Although this proved to be crisis-prone, such credit risk-shifting instruments nevertheless had the potential to enhance efficiency in the financial system (Llewellyn (2009a)).

9.3. THE TRADITIONAL MODEL

It is instructive to begin with a stylised review of the traditional model of the banking firm that was the dominant model for decades and formed the basis of standard text-book analyses of the banking firm (see Llewellyn (1999) for a fuller discussion). In this traditional model, financial intermediation is the dominant business of banks which have information, risk analysis, and monitoring advantages enabling them to solve asymmetric information problems and hence mitigate *adverse selection* and *moral hazard*. Banks accept deposits and utilise their comparative advantages to transform them into loans. In this model, the bank accepts the credit (default) risk, holds the asset on its own balance sheet, monitors borrowers, and holds appropriate levels of capital to cover unexpected risk. In the absence of external insurance of loans, it also effectively "insures" its loans internally through the risk premia incorporated into the rate of interest on loans. This is represented in the *traditional* model in Table 9.1. In this process, the bank offers an integrated service as it performs all the core functions in the financial intermediation process.

In this traditional model, the bank is not able to shift credit risk to other agents because of its asymmetric information advantages: a potential buyer or insurer of a bank loan might judge that, because of the bank's information advantage, there is an *adverse selection* and *moral hazard* problem in that the bank might select low-quality loans to pass on and, if it knew that it could pass on risk, might be less careful in assessing the risk of new loans and conduct less intensive monitoring of borrowers after loans have been made. For the same reason, the traditional view of the bank is that it is unable to externally insure its credit risks but instead applies a risk (insurance) premium on loans for expected risk and holds capital as

Table 9.1: Alternative Banking Models

	Traditional	Securitisation	CDS
(1) Accept deposits	✓	(✓)	✓
(2) Originate Loans	✓	✓	✓
(3) Utilise comparative advantage			
– Information	✓	✓	✓
– Risk analysis	✓	✓	✓
– Monitoring	✓		
(4) Transform into loans	✓	✓	✓
(5) Accept risk	✓		
(6) Hold on balance sheet	✓		✓
(7) Capital Backing	✓		
(8) Insurance	Internal	Shift	Insure

Tradition: *originate and hold*
Securitsation: *originate and sell*
CDS: *originate and insure*

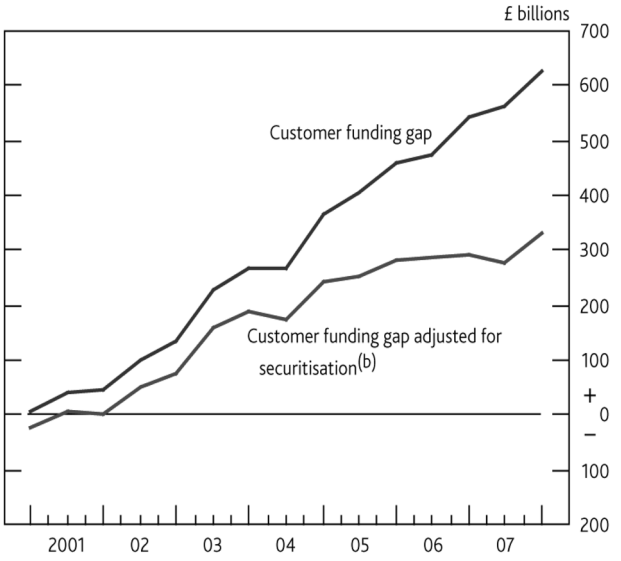
an internal insurance fund for unexpected risk. The reason for this is that, given the uncertainties outlined above, an external insurer would reflect this uncertainty in an excessive insurance (risk) premium charged to the bank which in turn would incorporate this in the risk premium in the interest rate charged on loans. Clearly, if this external premium is greater than the internal risk premium the bank would charge borrowers in the absence of external insurance, it would be more efficient for the bank to internally insure its loans. In this traditional view of the bank, credit risk cannot be shifted or insured, there is no liquidity in bank loans, and banks are locked into their loan portfolios.

9.4. PRE-CRISIS BANKING MODELS

In the decade or so before the onset of the crisis, banks developed new business models and moved away from the traditional model of originate-to-hold. The emergence of new business models focussed partly on new credit risk-shifting instruments. In varying degrees as between different countries, several trends in bank business models emerged in the years leading up to the crisis:

– banks increasingly diversified into more lines of business activity some of which in some cases had previously been inhibited by regulation;
– bank assets expanded at a substantially faster rate than retail deposits creating an ever-widening "funding gap" (Figure 9.5). This is also seen in trends in loan-deposit ratios (figures 9.6 and 9.7). Figure 9.6, for instance, shows that for major UK banks, the ratio of loans to deposits rose to a peak

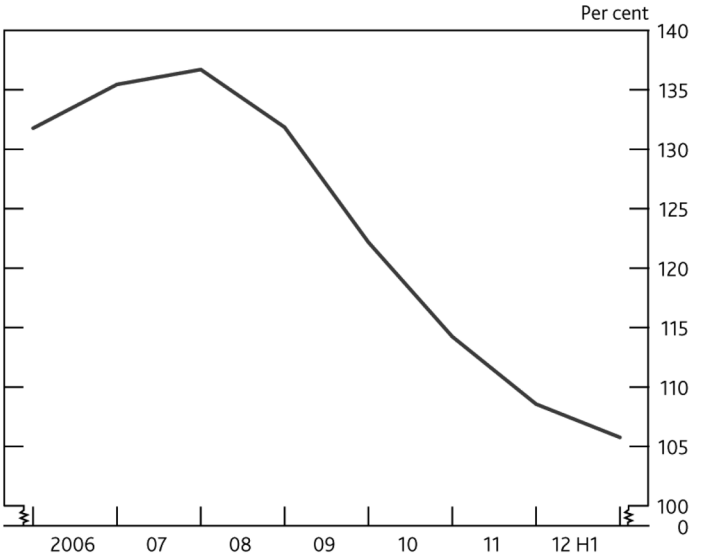
Figure 9.5: Major UK banks' customer funding gap [(a)]



Sources: Dealogic, published accounts and Bank calculations.

(a) Data exclude Nationwide.
(b) Customer funding gap less securitised debt. Where not available, stocks of securitisations are estimated from issuance data.

Figure 9.6: Major UK banks' loan to deposit ratio



Source: Bank of England (2007)

Figure 9.7: Deposit funding gap of euro area banks

Notes: Shows difference between loans to and deposits from non-monetary financial institutions, based on aggregate balance sheet of MFIs in euro area.

Source: Liikanen Report (2012)

of 136 percent in 2008 but declined sharply thereafter. The net result was a substantial rise in the proportion of total funding represented by various forms of wholesale market funds;

– the rise in bank loans substantially exceeded the rise in banks' risk-weighted assets held on the balance sheet. For the ten largest US banks, total assets doubled in the period 2004 to 2007 while the sum of risk-weighted assets (against which regulatory capital needed to be held) rose by only 20 percent. Furthermore, the loan-to-assets ratio of these banks declined from 52 percent in 1997 to less than 40 percent, while the investment-to-asset ratio rose from 32 percent in 1998 to 54 percent by 2008. At the same time, the deposit-to-asset ratio declined from 45 percent in 1998 to 36 percent in 2008;
– a key feature of the emerging bank models was a sharp rise in bank gearing ratios. As an example, Figure 9.12 shows the rising trend of leverage ratios of UK banks in the period 2000 to 2008 and the subsequent sharp contraction in the immediate post-crisis period;
– securitisation of loans became a central business strategy for many banks, and took various forms such as asset sales and Collateralised Debt Obligations (CDOs) via Special Purpose and Structured Investment Vehicles. There were (perverse) regulatory incentives for the creation of SIVs because, as regulators regarded them as separate from the owning banks, they were

largely free of regulatory capital requirements and, whilst they were able to receive outside funding with the owning banks' guarantees, there was no capital charge against the bank either, (see Tett (2009); McLean and Nocera (2010); Dunbar (2011); Morgenson and Rosner (2011); Thiemann (2012)). This issue is also considered elsewhere (e.g., Chapter 11) in this volume;

– investment and trading activity increased sharply and, in many cases, the proportion of traded assets in the total balance sheet rose substantially. Haldane *et al.* (2009) note that a major part of bank business strategies in the pre-crisis period was to increase the holding of assets held at fair value through their trading books relative to their holding of loans. In effect, the share of business loans to customers in total assets declined in the period 2000-2007. This rise in trading book positions was due in part to regulatory arbitrage as trading book assets had low risk weights appropriate for market, but not credit, risk. It became capital-efficient for banks to bundle loans into structured tradable products for onward sale in the market. A further characteristic of trading book activity is that positions are marked-to-market with gains and losses taken into the profit and loss account. The corollary is that holding a large trading book position was attractive when asset prices were rising which was the case in the years prior to the onset of the crisis;
– banks reduced their holdings of liquid assets as they developed greater access to wholesale funding markets;
– the extent of maturity transformation increased sharply as increasing use was made of short-maturity money market funding sources. With this came an increased dependency on wholesale and money market funding;
– a powerful trend emerged towards using credit derivatives (such as CDS contracts) as a means of shifting credit risk, (Llewellyn (2010)).

As noted by Borio. "the two most salient idiosyncratic aspects of the current turmoil are the role of structured credit products and that of the O&D (originate and distribute) business model," (Borio (2008)). The Bank of England also noted that, on the basis of increased gearing, banks expanded into higher-risk assets whose underlying value, quality and liquidity were unknown (Bank of England (2008)). Securitisation and credit derivatives were vehicles for not only an inordinate expansion of bank lending but higher risk lending.

9.4.1. ROE Strategies

Over-arching all of this was a clear shift in overall business strategy towards a focus on the rate of return on equity (Llewellyn (2007)), and with a short-termist focus. There were several reasons for banks focussing on ROE as a benchmark of performance: it was regarded as a useful performance measure which was easy to

measure; remuneration and bonus structures of senior staff were often related to short-term ROE, and a high share price offered a degree of protection from hostile take-over bids. However, as noted in Admati and Hellwig (2013), the ROE is in truth a poor measure of shareholder value because it does not take account of risk and the risk characteristics of the business model that produced high short-term rates of return. As part of this overall strategy, there was a substantial rise in the leverage of banks in the years prior to the onset of the crisis. Banks became extremely profitable though, as noted by Alessandri and Haldane (2009) in a detailed de-composition of returns to banking, this was because of excess gearing, securities trading, and enhanced risk-taking. Thus, while a rise in gearing (increase in debt relative to equity) would raise the ROE, it might also raise the risk profile of the bank and the potential loss to shareholders. The true benefit to shareholders of gearing arises only to the extent that the *actual* (long run) rate of return on equity is higher than the *required* rate of return on the basis of a bank's risk profile.

The basic bank profitability formula usefully illustrates the strategic options available when focussing upon ROE strategies:

$$\mathrm{ROE} = \mathrm{A}/\mathrm{E1} \times \mathrm{E1}/\mathrm{E} \times \mathrm{P}/\mathrm{RWA} \times \mathrm{RWA}/A$$

where A is a bank's total assets, E1 is tier 1 capital, E is common equity, P is the bank's net income, and RWA is the sum of risk weighted assets: note that A/E1 is the bank's leverage ratio. Thus, for a given rate of return on assets (P/RWA), the nominal ROE is automatically raised in line with leverage. Put another way, a bank which adopts a business model to maximize the nominal ROE has several strategic options: lower the equity ratio (increase gearing), adjust the ratio of risk-weighted assets to total assets, increase profitable trading and other activity that does not require equity capital, increase debt relative to equity capital, and move up the risk-return curve in favour of more risk. With respect to raising gearing, Admati and Hellwig (2013) emphasise that profitability increases to the extent that the rate of return on assets exceeds the cost of debt funds. Conversely, if this condition is not met the ROE rises with less debt and lower gearing.

In its *Global Financial Stability Report*, the IMF (2009) noted "a collective failure to appreciate the extent of the leverage taken on by a wide range of institutions and the associated risks of a disorderly unwinding." In addition, there was an increasing volume of trading in credit risks in a situation where it had become evident that the risks in such trading were not always clearly understood.

A central theme is that, in some important respects, financial innovation (and most especially the emergence of credit derivatives) changed the underlying economics of banking and the dominant business model. For illustrative purposes, a distinction is made in Table 9.1 between the *traditional model* of the bank (orig-

inate and hold), the *securitisation variant* (originate and sell), and the use of *credit default swaps* (originate, hold and externally insure).

As already noted, many aspects of the traditional model came to be questioned in the pre-crisis period. In the securitisation model in Table 9.1, the process of securitisation (including via CDOs) meant that banks were able to sell loans and hence not hold them on their own balance sheets, did not absorb the credit risk, and hence reduced the need to hold capital against credit risk.

The CDS model is similar to the securitisation model except that, while the credit risk was passed to the protection seller, the asset remained on the balance sheet of the originating bank. In this model there was explicit external insurance of bank loans which, as already noted in the traditional model, was judged to be uneconomic compared with internal insurance.

The two simplified examples of financial innovation in Table 9.1 related to credit risk illustrate that the traditional model of the banking firm came to be modified in a fundamental way.

As a result of all this, and the new business model that emerged, banks stopped behaving as banks in the traditional way and at the margin came to act as brokers in credit risk between ultimate borrowers and those who either purchased asset-backed securities or who offered CDS insurance, rather than their traditional role as market-makers in credit risk. In essence, in the decade prior to the crisis there was a clear strategic shift from the traditional relationship model to a more transactional model (van Ewijk and Arnold (2012)).

It is interesting that in three countries which escaped the crisis largely unscathed (Canada, Australia and South Africa), banks stuck to the traditional model and remained conservative institutions with comparatively little use of securitisation and credit derivatives. Furthermore, a study by the Centre for European Policy Studies – (CEPS) – (Ayadi, *et.al.* (2010)) found that Cooperative banks in Europe were also considerably less affected by the crisis than many other banks in Europe largely because they maintained the traditional business model of banking. Similarly in the UK, mutual building societies were less affected by the crisis though some did get into difficulty and needed to be supported (Llewellyn (2009)). Interestingly, those building societies that needed support were those which deviated most from the traditional business model of a mutual building society. Furthermore, the two banks that failed completely (Northern Rock and Bradford & Bingley) were former mutual building societies that had converted to bank status largely in order to change their business model. Some analysts, and indeed some bankers, argue from this contrasting experience that the lesson is "stay traditional and conservative".

An excellent analysis of how the composition of bank income changed as a result of the structural changes in capital markets in a sample of EU countries is given in ECB (2000). This illustrates how changes over time in bank business models impact on the structure of bank earnings.

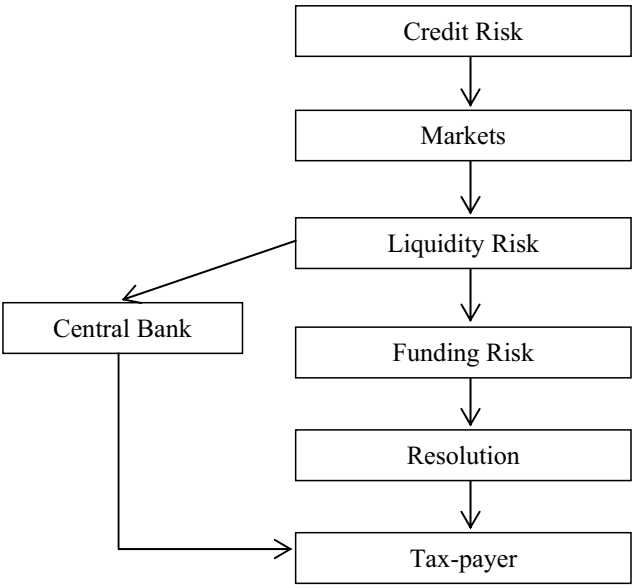
9.4.2. Risks in New Business Models

With the development of new business models, the nature of risks also changed. Securitisation and other credit derivatives are designed to shift credit risk and, for some years, they did so successfully. However, they also changed the nature of risks and, in particular, transformed credit risk firstly into liquidity risk (buyers of the securities issued to purchase securitised assets from banks being unable to trade them), then into a funding risk (the securitising banks being unable to either sell assets at other than fire-sale prices or roll-over maturing debt), and ultimately into a solvency risk. The last-mentioned arose because, in the absence of new roll-over money, banks were unable to sell assets in order to continue funding their securitisation programmes. A vicious cycle can easily arise in such circumstances: a bank which has engaged in substantial maturity transformation encounters funding difficulty (inability to roll over maturing debt) which it seeks to alleviate by selling assets which in turn depresses asset prices which in turn undermines the solvency of the bank. This problem becomes acute when all banks simultaneously attempt the same strategy of selling assets to replenish liquidity: herein lies the *fallacy of composition* whereby what may be rational for an individual bank acting alone ceases to be so when all banks adopt the same strategy.

In the case of Northern Rock (which developed securitisation as a central component of its business strategy (Llewellyn (2008)), an initial shifting of *credit risk* through securitisation exposed the bank to a *liquidity risk* that it (or its securitising Special Purpose Vehicle) would not be able to "roll-over" in the wholesale markets its maturing short-term borrowings that were used to fund the acquisition of long-term mortgages. This in turn was quickly transformed into a structural *funding risk* (as alternative sources of funding were unavailable) which was ultimately transformed into a *solvency risk*. The Bank of England has described the sequence in Figure 9.8. Securitisation and the use of credit derivatives therefore have both risk-shifting and risk-changing features.

The financial crisis revealed two major implications of credit risk-shifting instruments: (1) in many cases the risk was not in practice shifted as much as banks thought would be the case, and (2) even when credit risk was shifted this was sometimes at the cost of increasing market, liquidity, funding and ultimately solvency risk. In effect, credit risk that was initially shifted may involuntarily come back on to the balance sheet of the originating bank. There were several

Figure 9.8: Risk Transformation



reasons for this. Firstly, some banks' SIVs were unable to continue issuing asset-backed commercial paper to finance the purchase of loans from initiating banks. Secondly, loans that were planned to be securitised proved to be "unsecuritisable" because of funding constraints. Thirdly, originating banks were called upon to honour agreed lines of credit to SIVs. Fourthly, a bank might be induced to take securitised assets back on to the balance sheet in order to avoid a potential reputation risk.

The use of credit-risk-shifting instruments exposed banks to low-probability-high-impact risks in that the reliance on short-term wholesale market funding to finance long-term mortgages meant that some banks became structurally dependent on a limited number of wholesale markets for their funding. It was always judged that the simultaneous drying up of all these markets would be extremely unlikely as it had seldom, if ever, happened before. Equally, however, it would be very serious if it were to occur. In the event, this is precisely what did happen. Banks ignored the low-probability-high-impact risk of liquidity drying up in all markets simultaneously. Such risks applied equally to institutions and investors who issued short-term commercial paper in order to acquire asset-backed securities of various kinds.

9.4.3. Incentive Structures

Linked to new business models were internal incentive and reward structures that were part of banks' business models. Kashyap *et al.* (2008) give particular emphasis to the potentially perverse incentive structures in securitisation models.

Several dimensions to bank incentive structures were relevant in the evolution of business models and in the crisis: the extent to which reward structures were based on the volume of business undertaken; the extent to which the risk characteristics of decisions were incorporated (or not so) into management reward structures; the nature of internal control systems within banks; weak internal monitoring of the decision-making of loan officers; the nature of profit-sharing schemes, and whether or not decision-makers also shared in losses. In many cases rewards were asymmetric as substantial bonuses were paid in the event of high short-term profitability, while losses were not equally reflected in reward structures. Reward systems based on short-term profits and front-loaded pay-offs proved to be hazardous as they induced managers to pay less attention to the longer-term risk characteristics of their decisions. High staff turnover, and the speed with which officers moved within the bank, also created incentives for excessive risk-taking. Similar effects could arise through the herd-behaviour that is common in banking. The incentive structures favouring "short-termism" are epitomised in the now infamous statement of the Chairman of Citi (Chuck Prince): "As long as the music is playing, you've got to get up and dance. We're still dancing" (*New York Times*, July 10th, 2007).

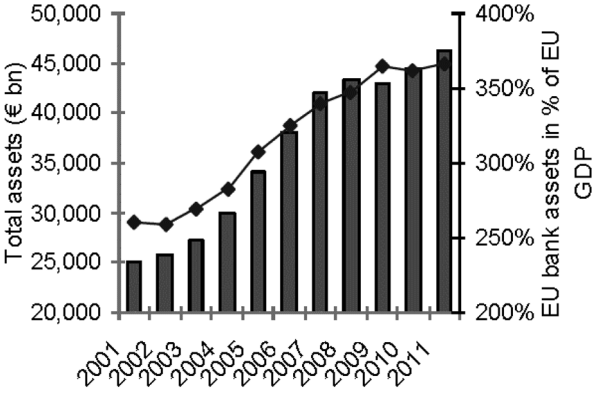
Overall, the evidence suggests that reward structures within banks (which often focus on short-term profitability) produced a bias to excessive risk taking. In particular, UBS (2008) identified systemic deficiencies in its compensation policy as a contributory factor in the substantial write-downs it suffered at the height of the crisis. It emerged that UBS AAA-rated mortgage-backed securities were charged a very low internal cost of capital. Traders holding such securities were allowed to count any spread in excess of this low hurdle rate as income which in turn determined their bonuses. If the internal cost of capital is under-priced, and bonuses are paid on any excess return over this low cost of capital, there is an almost inevitable tendency for traders to take excessive risk. In the case of UBS, there is also doubt about the extent to which senior management were aware of the way the bank's strategy was being executed or what the risks were in the bank's business model.

9.4.4. Excess Financialisation

The collective action of banks adopting new business models produced what might be termed "excess financialisation" of economies. This was seen in various

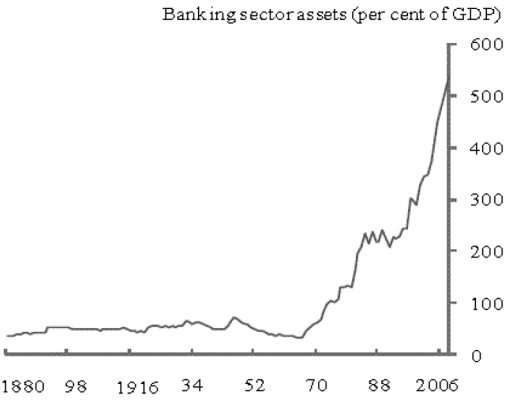
dimensions: the increasing role of banks in the financial intermediation process (figures 9.9, 9.10, 9.11); a sharp rise in the assets of the banking system relative to GDP; the rapid growth and overall size of the financial system in the economy; the burgeoning leverage of banks (as measured by their gearing ratios – Figure 9.12), the sharp rise in overall debt-GDP ratios in economies; the degree of intra-sector leverage (the extent to which leverage increased within the financial sector as financial institutions became increasingly exposed to other financial institutions); the frenetic pace of financial innovation; the sharp rise in trading volumes of banks; the market capitalisation of banks relative to overall market capitalisation of stock market companies (van Wensveen (2008)), and the share of total profits in the economy accounted for by banks.

Figure 9.9: Total assets of MFIs in EU 2001-2011



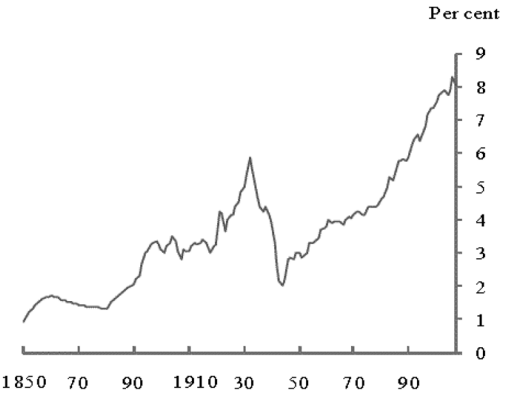
Note: Bar charts show total assets, dotted line shows assets in % of GDP.
Source: Liikanen Report (2012)

Figure 9.10: Size of the UK banking system



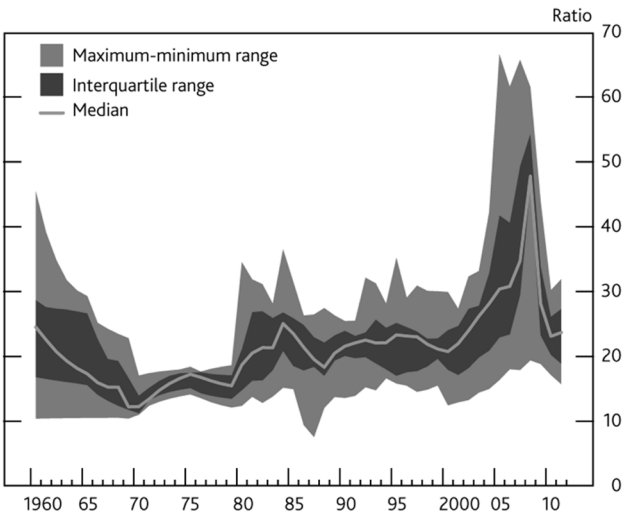
Sources: Sheppard (1971) and Bank of England

Figure 9.11: Share of the financial industry in US GDP



Source: Phillipon (2008)

Figure 9.12: UK banks' leverage



Source: Bank of England (2012)

In the UK, banking sector assets as a proportion of GDP rose from 40 percent in 1960 to 220 percent in 1990 and to 540 percent in 2008. Although this ratio tends to rise in all countries as national income rises, our theme is that these measures of "financialisation" became excessive and unsustainable.

The unsustainable "excess financialisation" that emerged from new bank business models that occurred in the decade before the onset of the crisis was largely associated with underlying factors which were themselves unsustainable

(Llewellyn (2010)). The growth of securitisation and structured investment vehicles, and the use of credit risk-shifting instruments, had the effect of inducing an over expansion of banking business and unrealistic perceptions of risk. Combined, these created conditions for banking activity to become excessive which the supervisory process did little to constrain even though in several countries (in various *Financial Stability Reports*) they expressed concern about many of the trends that culminated in the crisis.

Several factors within new business models lay behind the increasing role of banking and "excess financialisation" in the years leading up to the crisis:

- Banks adopted an explicit growth-orientated strategy in the context of a judgement that traditional banking had become a mature industry with limited growth in traditional business areas.
- Excess gearing, and an under-capitalisation, meant that banks could expand at a faster rate, and to a higher level, compared with the position had they maintained a level of capital commensurate with their risks. Overall, banks became highly leveraged with a rise in assets on the balance sheet relative to total capital, (Alessandri and Haldane (2009) and Wehinger (2008)). The Bank of England's analysis suggests that the high ROEs achieved by banks in the period running up to the crisis can be attributed almost entirely to increased leverage and higher risk profiles.
- The macro-economic environment, and the collective euphoria of the pre-crisis years (the period of the so-called Great Moderation), meant that risks were systematically under-estimated and also under-priced. This increased both the demand for loans and the willingness of banks to meet that demand. Several supervisory agencies (including the Bank of England (2006 and 2007)), the IMF and the BIS gave frequent warnings that risks were being systematically under-priced.
- The collective euphoria, and the high profitability of banks at the time, meant that the cost of capital was artificially low because it did not reflect the true risks that banks were incurring. This amounted to an effective subsidy to banks.
- The perceived safety-net for banks (government support, etc) also had the effect of lowering banks' funding costs. Alessandri and Haldane (2009) suggest that banks receive a substantial implicit subsidy from the existence (real or perceived) of bank safety net arrangements. Haldane (2011) gives estimates of the implicit value of guarantees received by banks amounting to an annual average of USD 1.3 trillion over the period 2007-2010.
- For various reasons, including the nature of the competitive environment at the time, banks adopted more short-termist strategies to maximise the rate of return on equity. In truth, profitability was enhanced not by superior banking performance, but by banks raising their risk threshold. As already

noted, internal reward and bonus structures created a bias towards short-termism and also to excess risk taking.
– The universal optimism generated by the dominant economic ideology of the time, namely the rational expectations and efficient-markets hypotheses (see, for instance, Fama (1970)) meant that rating agencies, central banks, governments, supervisors and many other agents, were not inclined to challenge the strategies and business operations of banks.

Each of these factors, created sufficient conditions for an over-expansion of banking activity, and an artificially enhanced role of banks. As might have been put by Sherlock Holmes: "It is elementary Dear Watson: if any industry is 'subsidised' or under-prices its product, it will grow too fast and become too big and to a level that becomes unsustainable without the subsidy!"

Our general theme is that new business models generated an "excess financialisation" of economies. The argument is that this became excessive and unsustainable because it was based on factors that were themselves unsustainable. In particular, the banking sector became excessively large and based on various forms of internal and external "subsidies" that could not be sustained in the long run. In this regard, banks expanded beyond their marginal economic and social value. Although banking seemed to be extremely profitable in the years prior to the crisis, this was misleading as such seemingly excess returns were based on various unsustainable "subsidies", an under-estimation and under-pricing of risk, and excessive gearing.

9.4.5. Diversity of Business Models

Although some common general trends emerged in the pre-crisis period, business models were not homogenous between banks, and diversity remained. A CEPS report (Ayadi *et al.* (2011)) offers an empirical study of business models and their implications for risk characteristics, business performance, and efficiency. The general conclusions of the study are summarised as follows:
– retail banks tended to be less risky (high Z scores), held more liquidity and made less use of credit risk-shifting instruments;
– investment banks were the most highly leveraged, were heavily engaged in trading activity, and tended to rely on less stable funding sources;
– market-based measures of risk in the period before the crisis (e.g. CDS spreads) seemed not to reflect differences in risk;
– a negative relationship emerged between banks' use of derivatives and the sum of their risk-weighted assets suggesting that derivatives were used to reduce the capital charge without lowering risk;

– wholesale banks (mainly German Landesbanks) which engaged in extensive securities and derivatives trading, who held lower levels of liquidity, and had a greater reliance on inter-bank funding) were the most risky.

The findings show that banks that kept their focus predominantly on retail business proved more resilient in the crisis, thanks to relatively lower leverage and higher loss absorbency capital. Most importantly, they were less likely to receive government support. Banks that relied excessively on leverage and short-term funding, and engaged in risk-shifting activities without retaining a portion of the risks on their books, were the worst performers during the crisis and the most likely to need government support. The analysis also emphasised that 'investment banking' (where the banks were also highly leveraged and heavily engaged in trading and repos markets) were badly hit by the crisis. These investment and wholesale banks were more likely to use derivatives to lower their risk-weighted assets, which was a central concept in measuring the Basel II regulatory capital.

9.5. POST-CRISIS PRESSURES ON EUROPEAN BANKING

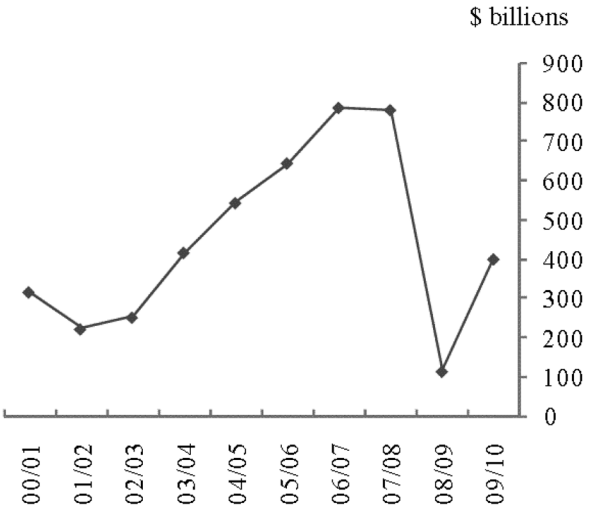
This and the next section consider business model scenarios in the post-crisis era in a short- and medium-term perspective. The starting point is that in the immediate post-crisis period, European banks faced an unprecedented combination of pressures in six key dimensions:

1. *balance sheet pressures* focussed on capital, liquidity and funding. Across the euro area, banks faced massive re-financing requirements at a time when conditions in the inter-bank and wholesale markets were extremely difficult. Many banks were effectively frozen out of key funding markets. At the same time, liquidity declined in several key markets, and sovereign debt exposure problems emerged;
2. *profitability* declined substantially in the immediate post-crisis period (Figure 9.13) which *inter alia* limited the extent to which banks could raise capital ratios from internal sources;
3. *the macro economy* in many euro area countries was weak and the forecast for the short-term outlook was at best anaemic. Herein lay the potential for a serious negative-feed-back-loop: weak bank lending impeding the possibility of economic revival, and weakness in the economy impairing the balance sheet position of banks through higher loan-loss experience. As a point of perspective, the December 2011 euro area Bank Lending Survey reported that 35 percent of banks reported a tightening in their lending conditions and lending interest rates rose in 2011(4);
4. *market pressures* mainly focussed on a combination of uncertainty about the position and even durability of the euro, substantial bank exposure to

sovereign debt (most especially with respect to Greece, Spain and Portugal), weakness in the supply of new equity to banks, and a rise in the cost of capital with suppliers of capital factoring in higher risk premia. Although banks across Europe were under capital pressure, few were able at the time to issue new equity capital on any significant scale. Trading conditions for banks weakened markedly as liquidity in some key financial markets was eroded. At various times in the immediate post-crisis period, banks' CDS prices rose (indicating higher market perceptions of risk), and inter-bank spreads widened as markets re-assessed risks attached to particular banks;

5. *funding*: Inter-bank, money market, and other unsecured funding sources became difficult. At the same time, imbalances emerged in banking markets with some banks hoarding liquidity at central banks rather than lending in the inter-bank markets, while others had large negative cash positions which were similarly not intermediated via the inter-bank markets;
6. *regulatory pressures* in the context of one of the biggest-ever intensifications of the regulatory regime focussed on capital and liquidity requirements. The evident danger was that these could prove to be massively pro-cyclical and weaken the financial intermediation role of banks at a time when European economies most need it.

Figure 9.13: Pre-tax profits of the world's 1,000 largest banks



Source: www.thebankerdatabase.com

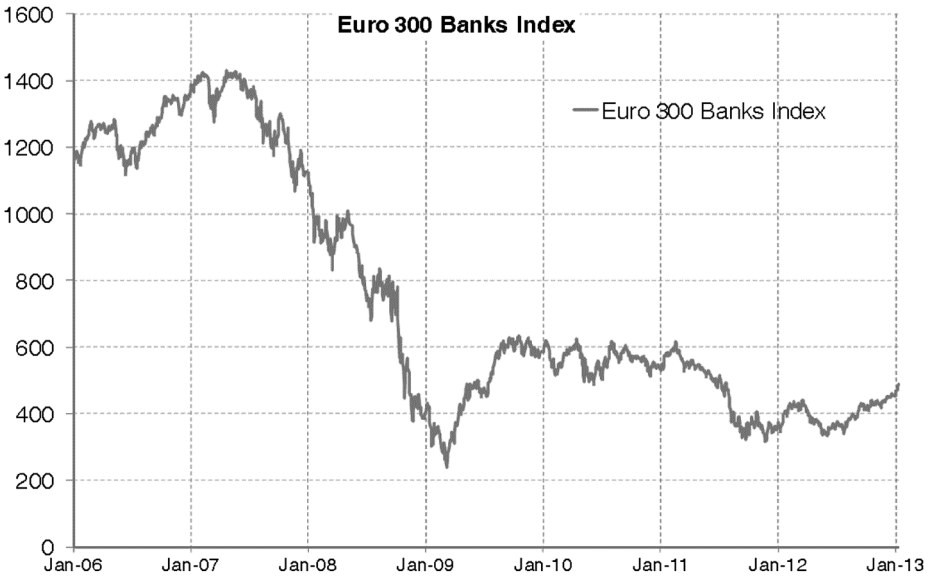
For an excellent outline of the difficult conditions in financial and banking markets that prevailed in the immediate post-crisis period see the *Monthly Bulletin* of the European Central Bank (December, 2011).

Each one of the pressures outlined above were formidable and presented banks and their regulators with demanding challenges. The central point is that it was the combination of pressures that potentially created a precarious position both for banks and the economies of Europe. Combined, they produced a substantial retrenchment in bank lending conditions.

There were also developments in the stock-market valuation of banks (Figure 9.14). In particular, bank equity prices fell sharply and remained weak with a wide differential emerging between market- and book-values of banks. This normally suggests market doubts about the true value of bank assets, scepticism about future earnings prospects, and a higher uncertainty discount as investors find it difficult to assess the true value of banks in current conditions.

At the end of 2011 banks across the euro area were finding it increasingly difficult (if possible at all) to raise unsecured funds in the bond markets and the cost of funding had risen to 2008 levels. Faced with enormous re-financing requirements in prospect in the first quarter of 2012, banks might have been required to sell assets on a substantial scale which, had such sales had a large impact on asset prices, could have transformed a financing into a solvency crisis for some banks.

Figure 9.14: Euro 300 Banks Share Price Index



Source: EBA (2013) – Data: Bloomberg, E3BANKS

9.5.1. ECB Intervention

It was at this stage that the ECB intervened on a massive scale with its new bank financing facility (LTRO), and the balance sheet of the ECB expanded sharply. In December 2011 and February 2012, the ECB made low interest rate and long-maturity loans to euro zone banks of over EUR 1 trillion. These loans were at a lower interest rate, in larger amounts, and for longer maturities than were available in the market. The intervention eased the immediate funding pressure on banks, removed the immediate need for substantial asset sales, bought time for banks to adjust and for countries to adopt structural reforms, and also allowed banks to meet margin calls on derivatives trading if, and when, required to do so.

All this represented a new business model not only for banks (relying on the central bank rather than the inter-bank market for funding) but also for the ECB as it was providing semi-permanent funding for commercial banks which is not the traditional role of a central bank. In effect, it took over bank financing from the interbank market. Several implications and reservations attached to this new business model for both banks and the ECB:

- ECB intervention in itself did not change the underlying position of banks that existed at the time;
- whilst it bought time (three years), there was always the issue of whether funding conditions would improve over this period and by the time that repayments needed to be made. There was, therefore, an exit problem to consider and whether the interbank market would take over the funding operations of the ECB or whether central bank support would be required for a longer period;
- it implied the ECB being exposed to potential credit risk;
- perversely, access to ECB funding sometimes had the effect of weakening banks' access to (and raising the cost of) private funding markets to the extent that the best quality collateral had already been pledged to the ECB;
- given the low cost of funding from the ECB (1 percent) there was an arbitrage incentive for banks to buy peripheral sovereign debt. Whilst the ECB is not allowed to lend directly to governments, it is able to lend to banks that in turn purchase sovereign debt;
- there was a danger that banks would develop business models on the assumption of ECB funding which, in time, they might find it difficult to extricate from.

In some respects (due largely to intervention by the ECB) there was some easing in the conditions faced by European banks in the second half of 2012 and in 2013: bank stock market prices rose from their low points in February 2009; what could have been serious re-financing problems for banks in 2012 was alleviated, and the European Banking Authority (EBA) indicated that most banks

were on track in raising their capital ratios. The problem, however, remained that palliatives and respites that buy time are not sustainable alternatives to structural adjustments to underlying problems.

However welcome the ECB's initiative was, it remained a palliative, and could not realistically become a permanent feature of European banking models. Whilst substantial ECB intervention through the LTRO programme alleviated funding problems and bought valuable time, the key question was always how the time bought would be used to strengthen bank balance sheets and business models.

9.5.2. The Debate about Equity Capital

The regulatory regime in the post-crisis scenario will imply significantly higher equity capital requirements (including minimum gearing ratios) on banks and most especially those regarded as systemically significant. This could have powerful implications for bank business models and the way that business strategies are constructed. A key, and controversial, issue is what impact such higher equity capital requirements will have on the cost of banking and bank lending strategies.

This is a much disputed area both within the regulatory community, academia and the banking community. A central issue is the extent to which (if at all) higher equity capital requirements impose a real cost on banks and the economy. It is frequently claimed (mostly by bankers) that imposing higher equity capital requirements and limiting gearing levels will lead to a rise in the funding costs of banks, lower bank lending, and lower rates of return on equity. This is allegedly because, as the cost of equity is higher than the cost of debt, raising the equity component will necessarily raise the overall cost of funding. It is because of this reasoning, and the tax advantage that applies to debt, that banks prefer debt rather than equity, and opt for high gearing.

On the other hand, there are theoretical and empirical challenges to this view. Admati and Hellwig (2013), and other academic studies including by the author (Llewellyn (2013)), challenge this assessment. In a comprehensive and detailed study, Admati and Hellwig make a powerful case for higher equity capital requirements arguing that it will neither raise the overall cost of capital (and hence bank lending margins) nor reduce the volume of lending. Other research also finds there is little, if any, impact on lending or the cost of loans (Hanson (2011); Miles (2011); Buch and Prieto (2012); Cole (2012); Junge and Kugler (2012)). Most empirical studies suggest that the macroeconomic costs of higher equity ratios are modest most especially when viewed in the context of the enhanced systemic stability that higher ratios would likely bring.

The basis of these studies is ultimately the standard Modigliani-Miller theorem regarding capital structure. If raising equity ratios lowers the probability of bank failure, the cost of both debt and equity will be lower. If the cost of both debt and equity becomes lower when equity is substituted for debt (because of lower risk), and equity holders have less to lose per unit of investment, there is no reason to suppose that the net effect will be a higher overall cost of capital. This also implies that, while the actual rate of return on equity might become lower, the required rate of return to equity investors is also lowered.

Similarly, there is no obvious reason why lending would be lower with a substitution of equity for debt as this would simply represent a different structure of funding of the same quantum of assets.

There are, however, limitations to these conclusions and derive from the restrictive assumptions of the Modigliani-Miller theorem. Firstly, bankruptcy costs in banking are not zero. Secondly, there are tax advantages with banks funding loans through debt (where the interest paid is tax-deductible) rather than equity. Thirdly, the existence of deposit insurance complicates the picture because, in theory at least, as there need be no risk premium in the interest paid to protected depositors, the cost of this component of debt would not decline with higher equity capital ratios. Our conclusion here is that whilst the impact of higher equity ratios on the overall cost of capital is likely to be modest, the Modigliani-Miller offset is unlikely to be total.

9.5.3. Strategic Options for Banks

Even by 2013 European banking remained more fragile and vulnerable than appeared on the surface (most especially with respect to capital and funding) and that the true position was being concealed by a combination of the substantial ECB intervention (displacing the inter-bank market in the context of funding difficulties faced by some banks), an under-estimation of risks associated with the weak European economy, inadequate provisioning against under-performing loans, and a manipulation of risk weights applied to some banks' assets. The net effect was that significant parts of the European banking system were probably under-capitalised and some banks had become excessively dependent on the ECB.

Banks that are capital constrained (for instance, when required by regulators to raise equity-assets ratios) have five broad strategic options within their business models: (1) inject more private equity capital either by capital issues or through retained profits although the latter can be a slow process when profitability is also under pressure; (2) issue convertible or bail-inable debt; (3) make various balance sheet adjustments: limiting loans and credit, selling assets or parts of the business, and technical balance sheet adjustments that have the effect of raising the equity

ratio (such as buying back bank debt that is trading at a discount and, where possible, re-calculating risk weights attached to some balance sheet items); (4) securitisation whereby banks generate loans though do not hold them on the balance sheet (and hence avoid a full capital charge) but sell loan packages to investors who fund the purchase through issues of securities, and (5) governments injecting capital.

In this regard, two immediate policy objectives emerged in the immediate post-crisis period: to sustain a stable banking system, and to ensure that banks were able to support growth and a revival of the European economies through their lending most especially to the corporate sector. A conflict between the two objectives arose when the former required a rise in equity capital ratios while the latter required an expansion of bank lending. This apparent conflict could be removed simply by banks injecting more equity capital. However, the conditions that prevailed at the time meant that this was both difficult (in some cases impossible) and expensive. In which case, banks responded to the need to build up equity ratios by de-leveraging which was precisely the opposite of what was needed if banks were to support the economy. In fact, bank lending in many EU countries was falling for some time in the immediate post-crisis environment.

Capital (equity) ratios in European banks rose in 2011 and 2012 with Core Tier 1 capital in UK banks, for example, rising from 6.5 percent in 2008 to around 11 percent and leverage on average declined sharply in UK banks from a ratio of 48 in 2008 to around 25 by the end of 2012. This was brought about by some capital injections but mainly a reduction in risk-weighted assets reflecting both de-leveraging and shifts to lower risk weighted assets or assigning inappropriately low risk weights to some assets. British banks also substantially lowered the loan-deposit ratio from 138 percent in 2008 to around 105 percent, reflecting both asset disposals and a rise in retail deposits.

However, in many cases capital (equity) ratios remained too low. Firstly, in many cases (including in the UK as warned in the Bank of England's December *Financial Stability Report*) banks were under-estimating and under-provisioning credit risk. Partly because of low interest rates, and also in order not to impair measured capital positions, banks increased forbearance in the weak state of the economy compared with past cyclical downturns in the economy. Although more companies were making losses during the recession than in the early 1990s, the number of insolvencies was sharply lower. Secondly, the risk weights applied to loans are opaque, often inconsistent between different banks, and often not a reflection of true risk. The Bank of England indicated that, on its assumptions, the aggregate equity position of UK banks was over-stated by between GBP 20 billion to GBP 50 billion. The IMF also argued on several occasions that across Europe there was an urgent need to re-capitalise banks.

9.5.4. Stock-adjustment Phase

In the immediate aftermath of the crisis, and in what earlier was termed the stock-adjustment phase, considerable market uncertainty developed about banks' capital position due to uncertainty focussed on the true value of bank assets. In many cases, banks were sitting on hidden losses of zombie companies. There was something of a vicious circle in all this: banks were under-estimating risks and over-estimating true asset values, which meant they needed to raise more capital. At the same time, and for the same reasons, markets were reluctant to supply new equity which in turn created further incentives for banks to forbear on low-quality loans. The banking sector faced formidable challenges. Across the European Union, some banks remained fragile and exposed to the possibility of further shocks (see Llewellyn (2013a)). In the words of Lascelles (author of the Centre for the Study of Financial Innovation's 2012 annual survey of banking conditions – *Banking Banana Skins*): "…concern about the outlook for banks has never been greater…concern this year is at the highest point in the thirteen years we have been compiling it." (*Financial World*, February, 2012)

In the post-crisis stock-adjustment phase, new features of bank strategies emerged including lower degrees of maturity transformation, a retreat from cross-border business (in some cases partly induced by supervisory pressure on banks), increased dependence on ECB funding, a relative decline in wholesale as opposed to retail funding, increased forbearance by banks on problematic loans, increased liquidity holdings (partly induced by regulation and increased risk aversion), and in some cases a sharp drop in the number of employees most especially in investment banking areas. For instance, UBS substantially reduced the number of employees in its fixed-interest business and cut back substantially its investment banking business. Similar trends occurred in many other banks.

Overall, there was a sharp tightening in credit conditions due in part to capital and liquidity constraints in the new regulatory regime, weak access to market financing, the requirement to build liquidity on the balance sheet, concerns over the value of collateral offered on loans, and the strategy of de-leveraging, combined with enhanced risk aversion. The context was also a sharp weakening in the general economic outlook in many European countries.

9.6. The Crisis as Long Term Transformational

Having considered the traditional business model of banking that existed decades before the crisis, and those prior to the crisis and the immediate aftermath, this section considers possible post-crisis scenarios in the medium to longer term (the new steady-state). The central theme is that the crisis will prove to be

transformational in several dimensions and three in particular: (1) the relative size of the banking industry, (2) bank business models, and (3) the cost of bank services. Post-crisis steady-state business models are likely to be dominated by four pressures: the unwinding of pre-crisis unsustainable business models and practices, the specific lessons of the crisis, a substantially more demanding regulatory environment, and structural measures (such as ring-fencing) imposed by new regulation. Liikanen (2012) observed that "markets are already forcing business model changes that will come about when Basel III is fully implemented".

9.6.1. Size and Cost of the Banking Industry

As many of the trends that supported the earlier "excess financialisation" and growth of banks were unsustainable, their removal is likely to have the reverse impact towards a more sustainable system and set of business models. As a result, banks may become less dominant in financial intermediation business than in the past. A member of the Bank of England's Monetary Policy Committee takes a similar view arguing that it is likely, and probably desirable, that "banks will become less significant intermediaries in channelling savings from households to companies and other households," (Miles (2009)). In particular, there is likely to be slower growth in bank balance sheets, bank business will decline as a share of GDP, they are likely to be less profitable than in the period running up to the crisis, and bank services are likely to become more expensive. This was also the scenario that emerged after the 1929 crash. The IMF has also argued:

> "immediate, short-run policies and actions taken need to be consistent with the long-run vision of a viable financial system….and that the viable financial sector of the future will be less leveraged and therefore smaller relative to the rest of the economy." (IMF (2009)).

Several factors work in this direction. Banks are likely to become more realistic about risks and their pricing and reverse the earlier under-pricing of risk. In addition, they are likely to become more risk averse. Notwithstanding the critique of Admati and Hellwig (2013), in practice the requirement to operate with significantly higher capital ratios and lower gearing is likely to impose some limit on the role of banks compared with the years prior to the onset of the crisis. This is likely to be reinforced by banks facing a higher and more realistic cost of equity capital. Regulatory costs more generally (including the requirement to hold more liquidity on the balance sheet) will also rise. It is also likely that internal reward and bonus structures will change to remove the bias towards excess risk-taking. Furthermore, banks will receive less comfort from being "too-big-to-fail" for two reasons: under new intervention arrangements (such as new Resolution arrangements) banks may be closed before they become insolvent, and penalties

(including tax) could be imposed on banks with access to safety nets. The latter could take the form of what amounts to *ex ante* insurance premia to be paid by banks to pay for rescues that might be needed in the future and in order to minimise the potential burden on the tax-payer. Hitherto, the tax-payer has effectively acted as an "insurer of last resort" but without extracting *ex ante* premiums.

For all these reasons, the cost of bank services is also likely to rise with the prospect that intermediation margins (the difference between lending interest rates and the rate of interest on deposits) widen. Because there will be a strong demand for retail deposits as banks shift away from wholesale funding, the widening of margins is likely to take place more in terms of higher lending rates than lower deposit rates.

These trends are likely to produce two outcomes: less credit generation in total, and some displacement of credit from banks to other routes: a process of *disintermediation*. If banks become more constrained in the post-crisis environment, a key issue is who will provide the displaced credit previously generated in the banking sector. Displacement could occur, for instance, through a re-activation of securitisation though in order to avoid some of the problems that surfaced during the crisis, it would need to be done in a different way, not the least through initiating banks keeping some of the risk themselves. Liikanen (2012) argues that "….the most complex types of securities such as CDOs and CDO-squared seem impaired beyond repair". Displacement may also occur through non-finance companies, and the capital market as bond financing displaces bank financing. Siemens announced that it is to establish its own bank in order to reduce reliance on bank financing and to give it access to deposit facilities at the central bank. There may also be further development of peer-to-peer lending.

All this leaves open the possibility that, with a lower role for banks and a greater focus on the capital markets, European financial systems may, to some extent, begin to converge on the US model of finance where markets relative to banks play a larger role.

9.6.2. Future Business Models

Bank business models are likely to change as a result of the trauma of the banking crisis and the regulatory response made to it. This could involve a reversion to the more traditional model of "originate to hold" implying originating loans, holding the assets on the balance sheet, monitoring borrowers, and holding capital against the credit risk with internal insurance displacing external insurance instruments such as CDSs.

The change in the nature of bank business models is also likely to include less reliance on more volatile wholesale funding sources and a greater reliance on traditional retail deposits. This will be accentuated by the withdrawal of official exceptional funding and liquidity support in some countries. Holdings of liquid assets will also be higher than in the past. It is also likely that internal reward and bonus structures will change to remove the bias towards excess risk-taking.

Regulation (and the requirement to create "living wills") is likely to induce banks to create less complex business structures, and higher regulatory capital requirements on banks' trading books may limit the extent of this business. The various proposals (Liikanen (2012) and the Independent Commission on Banking (2011) for ring fencing of different aspects of banks' business, will have the same effect. Overall, as Basel III squeezes the profitability of trading in fixed interest securities and derivatives, there is likely to be less trading, reversing the trend that emerged in the pre-crisis period.

With respect to structural regulation, there is something of an evolutionary line ranging from the Glass-Steagall Act of 1933 through to its abolition in the Gramm-Leach-Bliley Act of 1999, the Volcker Rules, and the idea of "ring fencing" as advocated by the UK's Independent Commission on Banking (2011) and subsequently the Liikanen Report (2012). Glass-Steagall limited the extent to which commercial banks could undertake investment banking business and have business links with investment banks (see, for instance, Bath *et al.* (2000)). The repeal of Glass-Steagall fundamentally changed the regulatory framework in which choices were made about business models and led to the emergence of financial conglomerates in the US which conducted a wide range of business not previously open to them. Some commentators have argued that the abolition of Glass-Steagall was a significant contributory cause of the 2007-2009 banking crisis. In the UK, the Report of the Independent Commission on Banking (2011) which was established by the British Government to consider regulatory implications of the crisis, proposed that, while banks could be free to conduct a wide range of business, a ring fence be placed around retail and small business commercial banking and that any investment banking business and securities trading they conduct should be undertaken through separately capitalised subsidiaries. In 2012, the Liikanen Report recommended mandatory separation of proprietary trading and other high risk trading from commercial banking, and a strengthening of capital requirements on trading assets and real estate lending.

There are both political and business challenges to the universal banking model. It seems likely that investment banking in European banks will lose global market share to a small number of US investment banks, a trend which emerged in the immediate post-crisis period. *The Economist* (2013) reported that in Europe investment banking revenues, volumes of business, and ROEs in investment

banking declined sharply as did the number of employees and remuneration levels. Regulatory requirements (regarding capital levels, ring-fencing, possible bans on proprietary trading, etc.) will also have a significant impact on investment banking in Europe in particular. While making a comprehensive case for Universal Banks on both efficiency and systemic stability grounds, Deutsche Bank Research (2012) recognises that "the political dynamics in Europe has shifted against universal banks….and risks putting European banks at a competitive disadvantage to their peers in the US and Asia".

In some business areas, the nature of investment banking is also likely to change. With the development of technology (such as algorithmic trading systems) many of the activities formerly undertaken by bankers will come to be carried out by computers. In some cases, many of these systems are being bought by banks' customers allowing them to trade directly with one another.

A key issue centres on the future role of securitisation in bank business models. Given the more constrained position of banks, there is an economic argument in favour of resurrecting the securitisation market which had become largely dormant in the immediate post-crisis years. Citigroup estimates that in 2008 securitisation supplied between 30 and 75 percent of credit in different sectors. Notwithstanding the problems that emerged with securitisation, and the fact that very little had been undertaken in the years immediately after the onset of the crisis, it remains a viable model and needs to be a major technique in the financial system. This is most especially the case if, as has been argued, banks will face more balance sheet constraints than in the past. There are systemic advantages to securitisation. The skill lies in developing the securitisation model while avoiding some of the pitfalls. This could include, for instance, greater transparency, a requirement for banks to keep some of the credit risk on their own balance sheets, and techniques that are less complex than in the past.

9.7. ASSESSMENT

For decades, banking in the major industrialised countries (with some exceptions such as in Scandinavia in the 1990s) was comparatively stable and based on what has been termed the "traditional" model of the banking firm. In this model, banks generated loans and kept the assets on the balance sheet and absorbed the resultant credit risk. This gave way (around 2000) to new models a key feature of which was that credit risk was shifted from the balance sheet through a process of various forms of securitisation and the use of credit-risk shifting derivatives such as CDOs and the use of credit default swaps. This in turn enabled banks to expand at a faster rate than would have been possible in the context of the traditional business model. The post crisis scenario has two phases: the immediate

stock-adjustment effect following the fall-out from the banking crisis, and an uncertain future longer-term scenario.

The European banking industry has reached something of a turning point where major regulatory changes will impact the size, growth, future business models and the structure of the financial system as a whole. The evolution of European banking and its business models over the coming years is likely to be dominated by the legacy of the crisis and the regulatory and supervisory responses to it. How the sovereign debt and euro crises are finally resolved will also significantly influence future bank business strategies. As always, technology will also continue to have an impact. A new (though uncertain) dimension will also come from the emergence of some form of European Banking Union.

Two dimensions to bank business models were identified at the outset: the range of business lines, and the way the traditional financial intermediation role is conducted. A key issue with respect to the latter is whether, and to what extent, banks will revert to the "traditional" model. Two issues emerge with respect to the former: the range of business lines adopted by banks, and the extent to which different business lines are to be conducted within differentiated business structures. A key dimension recommended by the Vickers Report (Independent Commission on Banking (2011)), and the Liikanen Report (2012), is the extent to which different business activities are to be "ring-fenced" and in particular whether core business is to be ring-fenced from other activities such as investment banking and securities trading. Regulatory decisions made in this area will have significant implications for future bank business models.

REFERENCES

ADMATI, A. and HELLWIG, M., 2013, *The Bankers' New Clothes: What's Wrong with Banking and What To Do About It*, Princeton, Princeton University Press.

ALLESSANDRI, P. and HALDANE, A. 2009, *Banking on the State*, available on Bank of England website.

AYADI, R., ARBAK, E. and DER GROEN, W.P., 2011, *Business Models in European Banking: A pre- and post-crisis screening*, Centre for European Policy Studies, Brussels, September.

AYADI, R., LLEWELLYN, D.T. and SCHMIDT, R.H., 2010, *Investigating Diversity in the Banking Sector in Europe: Key Developments, Performance and Role of Cooperative Banks*, Centre for European Policy Studies, Brussels.

BALLING, M, LIERMAN, F. and MULLINEUX, A, (eds.), 2003, *Technology and Finance: Challenges for Financial Markets, Business Strategies and Policy Makers*, Routledge/SUERF, London & New York.

BALLING, M., LIERMAN, F. and MULLINEUX, A., (eds.), 2006, *Competition and Profitability in European Financial Services: Strategic, Systemic and Policy Issues*, Routledge/SUERF, London & New York.

BANK OF ENGLAND, 2006, *Financial Stability Report*, October.

BANK OF ENGLAND, 2007, *Financial Stability Report*, April.

BANK OF ENGLAND, 2008, *Financial Stability Report*, October.

BATH, J., BRUMBAUGH, D. and WILCOX, J., 2000, "The repeal of Glass-Steagall and the advent of broad banking", *Journal of Economic Perspectives*, 4, 191-204.

BOOT, A.W.A. and THAKOR, A.V., 2009 in eds. BERGER, A., MOLYNEUX, P. and WILSON, J., *The Oxford Handbook of Banking*, OUP, 2009.

BORIO, C. 2008, "The Financial Turmoil of 2008?: A Preliminary Assessment and Some Policy Considerations", *BIS Working Paper* No. 251, BIS, Basel, March.

BUCH, C., PRIETO, E., 2012, "Do Better Capitalised Banks Lend Less? Long Run Panel Evidence from Germany", *Working Papers in Economics and Finance* 37, Faculty of Economics and Social Sciences, University of Tubingen, Tubingen, Germany.

COLE, R., 2012, "How Did the Financial Crisis Affect Small Business Lending in the US?", *Research Study*, US Small Business Administration, Washington, DC.

DEUTSCHE BANK RESEARCH, 2012, "Universal Banks: optimal for clients and financial stability", *Current Issues: Global Financial Markets*, November 12.

DUNBAR, N., 2011, *The Devil's Derivatives: The Untold Story of the Slick Traders and Hapless Regulators Who Almost Blew Up Wall Street .....and Are Ready To Do It Again*, Harvard Business Review Press.

ECONOMIST, 2013, *Wall Street is Back*, May 11th.

EUROPEAN BANKING AUTHORITY, 2013, *Risk Assessment of the European Banking System*, London, January.

EUROPEAN CENTRAL BANK, 2000, *EU Banks' Income Structure*, Frankfurt.

FAMA, E.F., 1970, "Efficient Capital Markets: A Review of Theory and Empirical Work", *Journal of Finance*, 385-417.

GARDENER, E., MOLYNEUX, P. and MOORE, B., (eds.), 2002, *Banking in the New Europe: The Impact of the Single Market Programme and EMU on the European Banking Sector*, Palgrave Macmillan, Basingstoke.

HALDANE, A., 2009, "Re-thinking the financial network", *speech to the Financial Student Association*, Amsterdam, available on Bank of England website: www.bankofengland.co.uk.

HALDANE, A., 2010, "Regulation or Prohibition: the USD 100 billion Question", *Journal of Regulation and Risk*, North Asia 2 (2-3).

HALDANE, A., 2011, "Control Rights (and Wrongs)", *Wincott Annual Memorial Lecture*, Westminster, London, October 24.

HANSON, S., KASHYAP, A. and STEIN, J., 2011, "A Macroprudential Approach to Financial Regulation", *Journal of Economic Perspectives*, 25 (1).

INDEPENDENT COMMISSION ON BANKING, 2011, *Final Report: Recommendations*, September.

INTERNATIONAL MONETARY FUND, 2009, *Global Financial Stability Report*, April.

INTERNATIONAL MONETARY FUND, 2010, *A Fair and Substantial Contribution by the Financial Sector: Final Report for the G20*, IMF, Washington, September.

KASHYAP, A.K., RAJAN, R. and STEIN, J., 2008, "Rethinking Capital Regulation", paper presented at the Federal Reserve Bank of Kansas City, Jackson Hole symposium, Managing Stability in a Changing Financial System, August.

JUNGE, G. and KUGLER, P., 2012, "Quantifying the Impact of Higher Capital Requirements on the Swiss Economy", Mimeo, University of Basel, Basel, Switzerland.

LIIKANEN REPORT, 2012, *High Level Expert Group on Reforming the structure of the EU Banking Sector*, Final Report, October.

LLEWELLYN, D.T., 1999, "The New Economics of Banking", *SUERF Study*, No. 5, SUERF, Vienna.

LLEWELLYN, D.T., 2007, "Why are British Banks so Profitable?", *Economic Notes*, June.

LLEWELLYN, D.T., 2008, "The Failure of Northern Rock: A Crisis Waiting to Happen", *Journal of Financial Regulation and Compliance*, March.

LLEWELLYN, D.T., 2009, "UK Building Societies and the Financial Crisis: The Survival of Mutuality" in Ed. J. MOOIJ, *Cooperative Banks in the Crisis*, Rabobank, Utrecht.

LLEWELLYN, D.T., 2009a, "Financial Innovation and the Economics of Banking and the Financial System" in ANDERLONI, L., LLEWELLYN, D.T. and SCHMIDT, R.H. (Eds.), *Financial Innovation in Retail and Corporate Banking*, Cheltenham, Edward Elgar.

LLEWELLYN, D.T., 2010, *The Global Banking Crisis and the Post-Crisis Banking and Regulatory Scenario, Topics in Corporate Finance*, Amsterdam Centre for Corporate Finance, University of Amsterdam, October.

LLEWELLYN, D.T., 2011, "A Post-Crisis Regulatory Strategy: The Road to "Basel N" or "Pillar 4"?, Austrian National Bank Conference Proceedings, Annual Economics Conference, 2011, Austrian National Bank, Vienna.

LLEWELLYN, D.T., 2013, "A strategic approach to post-crisis regulation: the need for Pillar 4", in eds. A. DOMBRET and O. LUCIUS, *Stability of the Financial System*, Edward Elgar.

LLEWELLYN, D.T., 2013a, "The Fault-Lines in European Banking", *Financial Services Focus*, February.

MCLEAN, B. and NOCERA, J., 2010, *All the Devils are Here: The Hidden History of the Financial Crisis*, New York, Portfolio Trade.

MILES, D., 2009, *The Future Financial Landscape*, speech given to Bloomberg, 16th December, 2009. Available at www.bankofengland.co.uk/publications/speeches/2009/speech418.pdf.

MILES, D., YANG, J. and MARCHEGGIANO, G., 2011, "Optimal Bank Capital", *Bank of England Monetary Policy Committee Discussion Paper* No. 31, January. Available at: www.bankofengland.co.uk.

MORGENSON, G. and ROSNER, J., 2011, *Reckless Endangerment: How Outsized Ambition, Greed, and Corruption Led to Economic Armageddon*, New York Times Books.

NEW YORK TIMES, 2011, *Citi Chief on Buyouts: We're Still Dancing*, July, 10.

TETT, G., 2008, "Leaders at wits' end as markets throw one tantrum after another", *Financial Times*, October 11th.

TETT, G., 2009, *Fool's Gold: How the Bold Dreams of a Small Tribe at JP Morgan Was Corrupted by Wall Street Greed and Unleashed a Catastrophe*, New York Free Press.

THIEMANN, M., 2012, "Out of the Shadow? Accounting for Special Purpose Entities in European Banking Systems", *Competition and Change*, 16.

TURNER, A., 2012, *Shadow Banking and Financial Instability*, speech at CASS Business School, March, 2012. Available at: www.fsa.gov.uk.

UBS, 2008, *Shareholder Report on UBS's Write-down*, UBS, Zurich, April.

VAN EWIJK, S. and ARNOLD, I., 2012, "How bank business models drive interest margins: Evidence from US bank-level data", paper presented at European Banking Authority 2012 Research Workshop, London. Available at: www.eba.europa.eu/cebs/media/publications.

VAN WENSVEEN, D., 2008, "Banks Prosper Against the Odds: Why?", *De Economist*, September, pp. 307-338.

WEHINGER, G., 2008, "Lessons from the Financial Market Turmoil: Challenges Ahead for the Financial Industry and Policy Makers", *Financial Market Trends*, OECD.

10. Performance in European Banking: Productivity, Profitability and Employment Trends

Philip Molyneux

Abstract

This chapter examines the structure, efficiency and productivity of European banking systems highlighting some of the major changes that have occurred over the last fifty years. We show how the number of banks has fallen overtime with a general increase in concentration. Banks have undertaken both product and geographic diversification, the former aimed at boosting non-interest income as traditional margin based business becomes more competitive. Demarcation lines between different types of financial activity have eroded rapidly over the last 50 years, cartel arrangements common to fixing bank prices have been abolished and the general competitive environment has heightened. There has been a drive to improve operational efficiency and productivity – with mixed results. There is, however, some evidence that integration of European banking systems has led to some productivity gains. The 2007-8 financial crises has been a major shock to the system, with large government interventions in many countries and significant on-going regulatory reform aimed at boosting capital, liquidity and curtailing excessive risk-taking. It is unclear as to what the ultimate impact of this reform will be on the performance of European banks – although it seems likely that reform will lead to a more conservative and less competitive system.

10.1. Introduction

Europe's economic environment has experienced considerable change since the era of post-War state capitalism that tended to predominate in many countries in the 1950s. Primary industries and manufacturing tended to dominate economic systems, international trade was limited, and many businesses operated under restricted environments – characterised by cartel and/or quasi oligopoly structures. Economic growth was stable yet sluggish, inflationary pressures were modest and exchange rates were fixed. Tax rates were also typically high. Banking systems were mainly segmented and commercial banks focused on business customers. Mutual banks, of one form or another, were the main providers of personal financial services. Investment banking was often the preserve of either specialist (so-called) merchant banks or, in universal banking systems, part of commercial banks.

The operating environment outlined above remained in place until the 1970s when economic systems were 'shocked' by the abandonment of the Bretton

Woods fixed exchange rate system (in August 1971) and the OPEC oil crisis of 1973, leading to a period of high and volatile rates of interest, increased budget deficits and balance of payments disequilibria. The OECD (1995) observed that the most significant 'hangover' from this period was that it introduced much greater uncertainty into business and household expectations, be they concerned with prices, market outlets, exchange rates or interest rates. These were major contributory factors that led to European recession in the late 1970s and early 1980s.

The structural slowdown of economic development and the deep-seated disequilibria of the period strongly affected the size, direction and variability of both domestic and international financial flows. Typically, savings as a proportion of household income declined over this period, although both household and corporate sectors were net lenders – and in particular corporate asset growth substantially exceeded that of their liabilities. In the international arena, the increased scale and volatility of capital flows, coupled with increased liberalization, encouraged greater financial market liberalization (Pecchioli (1983)).

An important financial sector liberalization driver was the EU's First Banking Directive of 1977 that started a programme of EU legislation aimed at reducing barriers to cross-border banking activity. From the mid-1980s onwards, deregulation at the national level eliminated many of the lines of demarcation between banks and other financial service providers, and helped facilitate cross-border competition. Many European banks took advantage of the opportunities afforded by deregulation and expanded the scale of their operations, often through merger and acquisition (M&A). Such expansions took place in order to realize scale and scope economies, and spread risk through product or geographic diversification. Geographic diversification involved the establishment of subsidiaries and branches in other EU member states. By the end of the century, significant progress had been made towards creating a fully integrated single market in banking and financial services in Europe. However, according to Dermine (2006) while wholesale banking had become highly integrated, retail banking and small business lending remained nationally oriented, with relatively little cross-border activity.

The structure of banking systems of individual EU member states remained rather heterogeneous. There was also substantial variation in the average profitability of banks located in different EU countries. For example, German banks suffered from relatively low levels of profitability during the early and mid-2000s, while banks in Belgium, Sweden and UK enjoyed relatively high average profitability. Such differences were due to a number of factors: variation in accounting and tax systems; structural elements such as the intensity of competition in specific product segments; the extent of product and geographic diversification; and business cycle effects.

The failure of the UK's Northern Rock in 2007 preceded a financial crisis across European banking systems and elsewhere, particularly the US. The financial crisis led to large losses and failure and closure of many banks, and forced the intervention of both central banks and governments. Initial responses to the crisis were manifold and included: government purchase of troubled assets; changes in rules surrounding assets accepted as collateral; nationalization or part nationalization of financial institutions which were thought too-big-to-fail; and increased government guarantees of consumer deposits and other bank liabilities. Poor monetary policies, misaligned incentives for investors, banks and credit rating agencies, limited financial disclosure, accounting rules, lax lending standards and loopholes in regulation and supervision, as well as fraud have all been cited as contributory factors to the financial crisis.

Governments in Europe responded with a variety of policies aimed at improving disclosure and transparency and reducing the potential for moral hazard via the safety nets instituted by various agencies. Specific action has been taken such as: extension of coverage of bank regulation based on economic substance rather than legal form; increased capital requirements; counter-cyclical capital requirements; enhanced regulation and supervision of liquidity; enhanced supervision of credit rating agencies; codes covering executive pay and benefits; improved arrangements for regulation of the activities of cross-border banks; reform of accounting disclosure rules; and the establishment of consumer protection agencies.

There were signs of banking system and economic recovery during 2009. This trend, however, stalled with the onset of the sovereign debt crisis that befell various European economies (particularly Greece, Ireland, Portugal, Italy and Spain) during 2010 and 2011. Government debt and deficits led to a crisis of confidence that resulted in widening bond yield spreads and risk insurance on credit default swaps between these countries and other EU members, most notably Germany. In May 2010, the Eurozone countries and the International Monetary Fund agreed to a EUR 110 billion loan for Greece, conditional on the implementation of tough austerity measures. Later in May, Europe's Finance Ministers established the European Financial Stability Facility (comprising of a broad rescue package amounting to USD 1 trillion) aimed at ensuring financial stability across the Euro zone. After the Greek bailout, Ireland had to be supported to the tune of EUR 85 billion in November 2010, followed by a EUR 78 billion support program for Portugal in May 2011. This helped many European banks (particularly in Germany and France) that are large holders of sovereign debt although in the majority of countries large banks still have had to raise massive amounts of new capital and are continuing to struggle to achieve returns in excess of the cost of capital. Banks in Europe and many other jurisdictions have become increasingly conservative, raising capital, restricting

lending and boosting their liquidity positions. The large, internationally active banks in Europe are also subject to increased capital and liquidity requirements under Basel III (ECB (2012)).

It is against this background, that this chapter discusses the structure and performance features of European banking systems. The chapter is structured as follows with Section 10.2. providing an overview of the structural features of European banking, Section 10.3. outlines cost, revenue and efficiency dimensions of European banks with Section 10.4. focusing on productivity and profitability issues. Section 10.5. covers banking sector competition and regulations influence on bank performance and Section 10.6. the conclusion.

10.2. STRUCTURAL FEATURES AND EMPLOYMENT

European banking has changed markedly over the last 50 years and probably most rapidly over the last two decades. Deregulation (via the EU's 1988 Second Banking Directive); the creation of the single market in financial services; and the introduction of the euro have allowed banks to trade more freely not only in their domestic markets, but also throughout Europe. Banks have increased the range of products and services to customers, leading to the distinction between banks, insurance companies and other financial firms becoming increasingly blurred. Entry by foreign-owned banks into many European banking markets caused competition to become more intense in many segments. This placed additional pressure on banks to lower costs, and find new ways of increasing revenues from new types of products and services. The implementation of the EU's Financial Services Action Plan between 1999 and 2004 provided greater EU wide integration in the banking system, and increased the inter-connections between cross-border financial institutions. In addition, technological advances also impacted on bank behaviour with internet banking proliferating and new payments media emerging. Technology revolutionized delivery systems and led to small and large banks adopting different business models (Goddard *et al.* (2001)). The growing emphasis on performance and shareholder value encouraged many banks to reappraise their asset and liability management strategies.

Overall, European banking was transformed in the two decades preceding the 2007-8 financial crises by an array of developments including: globalization, deregulation, technological change, integration and harmonization through the creation of a European single market in banking (Goddard *et al.* (2010)). These have impacted substantially on the industrial organization of the banking industry. For example, Table 10.1 reports structural indicators for the banking sectors of the EU-15 countries. The Table shows that between 1985 and 2011, the total number of banks operating in all major economies declined substantially. In

France, Germany, Italy, Spain and the UK combined the increase in nominal total assets over this period was in excess of 400%.

In France, Greece, Italy, Spain and Portugal, the number of bank branches increased substantially between 1985 and 2011, while the numbers fell dramatically in Belgium and the UK. Much of the increase was a result of the de-liberalisation of branching restrictions that encouraged expansion, whereas consolidation and closure was the trend elsewhere. EU-15 banking sector employment increased by more than 13% over the same period reaching 2.65 million by 2011. Germany has the largest number of staff employed in banking amounting to some 664,000 individuals, followed by the UK (454,000) and France (430,000). In most countries, employment in the banking and finance sectors contribute around two-thirds of total financial sector employment, with insurance and other sectors the rest. A general trend in banking since the 1970s onwards has been the increased presence of female and part-time employees. An extreme example being in the UK where, according to the British Bankers Association (2012), the top ten banks employed 288,100 staff of which 60% were female. Around 37% of female staff is part-time compared with only 4% of male employees.

Table 10.1 also illustrates, banking sector concentration ratios for markets defined by national boundaries have also increased in the majority of EU countries. Papademos (2005) estimated that the 14 largest banking groups accounted for around one-third of total EU bank assets by the mid-2000s. In view of the cross-border merger trend during the 2000s the long-term trend in EU-level banking sector concentration has clearly been upward.

Consolidation has been a prominent feature of European banking during the 2000s. M&A within national borders may present more straightforward opportunities for realizing cost savings or efficiency gains than cross-border M&A, and perhaps fewer complications if the corporate cultures of the merger partners are homogeneous (Buch and DeLong (2008)). However, it is likely that increased emphasis will be placed on cross-border M&A in the future, as domestic banking markets become increasingly congested. The growth of the cross-border M&A movement suggests that there has been a reduction of several barriers that may have been insurmountable in the past, including difficulties in selling generic products across borders; differences in competition, employment, regulatory and supervisory policy; political interference; and a lack of consumer trust in foreign banks. In the past there has been an inclination for the competition authorities in some countries to disqualify mergers between banks that already dominate their domestic retail markets and this may have the unintended consequence of promoting cross-border M&A. For example, the UK's Competition Commission had indicated that mergers between the four largest retail banks (HSBC, Barclays, Lloyds TSB and RBS) would be discouraged. Accordingly, these banks tended to

look outside the UK for feasible acquisition targets. The bidding war between Barclays and a consortium including RBS to acquire the Dutch bank ABN AMRO in 2007 was a case in point. On the other hand, national chauvinism on the part of some European governments, unwilling to sanction the foreign acquisition of important domestic banks, may present an obstacle to cross-border consolidation in certain cases.

As can be seen from above, Europe has a diverse and dynamic banking sector. This is neatly highlighted by the Final Report of the High-level Expert Group on Reforming the Structure of the EU Banking Sector that states:

> The EU banking sector is diverse, which is valuable. Banking sectors differ substantially across Member States, in terms of size, market concentration, foreign ownership, asset and liability structure, supervision, credit cycle, and public involvement. Diversity strengthens the resilience of the banking system as it mitigates vulnerability to systemic interconnections and promotes effective competition. Diversity is explicitly protected by the EU treaty. (Liikanen (2012), p. 32).

10.3. REVENUE, COST & EFFICIENCY

European commercial banks from the 1950s onwards pretty much depended on interest margins as the main driver of bank performance. This meant that profits depended on banks maintaining a sizeable gap between interest income and costs, while at the same time trying to reduce operational inefficiency. As systems liberalized and cartels broke down, competition in loan and deposit markets intensified driving down margins. This was a clear trend from the early 1980s to early 2000s in many banking systems. The reduction in margins encouraged banks to supplement their income (where possible) by diversifying into non-interest income (or non-traditional) areas such as insurance and securities underwriting. Following the EU's Second Banking Directive of 1989, for instance, noninterest income as a proportion of total income increased from 26% in 1989 to 41% in 1998 (ECB (2000)) and has remained around this level (experiencing various swings) by end-2012[1].

The shift towards a greater emphasis on non-interest income may help maintain profits but it is more volatile than revenue from traditional sources. (Stiroh and Rumble (2006)) and there is evidence to suggest that low-risk traditional banking activity will subsidize the more volatile non-interest income activity (Boot and Schmeits (2000)). Most work in the area confirms the findings of Stiroh (2004)

[1] According to ECB (2013) Consolidated Banking Data for December 2012 the non-interest income as a % of total income amounted to 41%. See www.ecb.int/stats/money/consolidated/html/index.en.html.

Table 10.1: Structural indicators for EU-15 banking sectors

	Number of banks				Assets (billion euros)				Number of branches				Employees ('000s)				Concentration (Assets CR_5)			
Country	1985	1995	2005	2011	1985	1995	2005	2011	1985	1995	2005	2011	1985	1995	2005	2011	1985	1995	2005	2011
Austria	1406	1041	880	783	-	396.8	720.5	1010.4	-	4856	4300	4431	-	74	75	78	-	39.0	45.0	35.9
Belgium	120	143	100	122	285.9	589.4	1055.3	1198.4	8207	7668	4564	3881	71	77	69	61	48.1	54.0	85.2	70.8
Denmark	259	202	197	164	96.3	125.5	722.1	1144.9	3411	2215	2114	1557	52	47	48	47	61.2	72.1	66.3	66.3
Finland	498	381	363	358	-	196.3	234.5	642.4	-	1612	1616	1422	-	31	25	23	-	70.6	83.1	80.9
France	1952	1895	1577	1147	1348.8	2513.7	5090.1	8391.5	25782	26606	27075	38323	449	408	430	379	46.0	41.3	53.5	48.3
Germany	4739	3785	2089	1956	1495.1	3584.1	6826.6	8393.5	39925	44012	44044	37853	591	724	705	664	-	16.7	21.6	33.5
Greece	41	53	62	79	69.2	94.0	281.1	476.9	1815	2417	3576	3845	27	54	61	60	80.6	75.7	65.6	72.0
Ireland	42	56	78	590	21.0	45.8	941.9	1312.8	-	808	910	1099	-	38	38	36	47.5	44.4	46.0	53.2
Italy	1101	970	792	785	546.8	1070.5	2509.4	4065.0	13033	20839	31498	33561	319	337	336	316	-	32.4	26.7	39.5
Luxembourg	177	220	155	554	169.8	445.5	792.4	1101.5	120	224	155	227	10	19	23	27	26.8	21.2	30.7	31.2
Netherlands	178	102	401	297	226.7	650.0	1697.7	2428.7	6868	6729	3748	2653	92	111	117	105	72.9	76.1	84.8	83.6
Portugal	226	233	186	159	38.0	116.3	360.2	573.8	1494	3401	5427	6403	59	60	58	61	61.0	74.0	68.8	70.8
Spain	364	506	348	415	311.3	696.3	2150.7	3643.0	32503	36405	41979	40103	244	249	253	246	35.1	47.3	42.0	48.1
Sweden	598	249	200	205	-	146.9	653.2	1140.4	-	2731	1910	2083	-	44	46	50	-	59.3	57.3	57.8
UK	772	564	400	405	1293.6	1999.5	8320.2	9708.2	22224	17522	13694	11686	375	445	483	454	-	28.3	36.3	44.1
EU15	12473	10400	7828	8019	na	12670.6	32355.9	45231.4	na	178045	186610	189127	na	2718	2767	2607	na	50.2	54.2	55.7

Note: The large increase in the number of Irish banks in 2011 was due to a reclassification of credit unions as banks.

Sources: Central Bank Reports (various); ECB (2006), ECB (2007), ECB (2010) and also from ECB Consolidated Banking Data (online resource).

on US banks that it does not tend to boost returns but adversely impacts on return volatility (and trading income is also the most volatile). An extensive literature highlights that agency problems derived from product/ service diversification outweigh the benefits from economies of scope (Laeven and Levine (2007)). A study of European banks by Lepetit *et al.* (2008) over 1996 to 2002 shows that those earning higher commission and fee income have lower interest margins suggesting an under-pricing of loans to boost fee-based services. Banks, expanding into non-interest income activities, may lose their focus on traditional lending activity and this may encourage managers to be less conservative in their lending activities that may boost credit risk. An argument that may well have had resonance during the securitization boom where credit growth expanded rapidly with little monitoring as the risks were sold-on by banks to investors in the form of mortgage-backed and other asset-backed securities. More recently, Brunnermeier *et al.* (2012), find that banks with higher non-interest income (from securities trading, venture capital and investment banking activity) tend to contribute more to systemic risk compared to those that focus more on traditional commercial banking.

Given the general recognition that an excessive focus on non-interest revenue, and particularly securities trading and investment banking activity can increase risk this has led to: proposals in the UK (Vickers Commission) to ring-fence retail and various investment banking activities; recommendations of the U.S Dodd-Frank Act of 2010 to not allow banks to undertake proprietary trading and to limit their hedge fund and private equity activity; and in the EU to legally separate various 'risky financial activities from deposit-taking banks within a banking group' (Liikanen (2012)).

Trends in the sources of income for European banks have been relatively common – a fall in interest margins compensated by an increase in non-interest income. The picture for changes in costs, however, is less clear. Aspects of technological change include innovations that reduce costs associated with the collection, storage, processing and transmission of data, and those that transform the means whereby customers gain access to banking services and products. Significant front-office innovations are reflected in the growth in number and usage of automated teller machines (ATMs), electronic funds transfer at the point of sale (EFTPOS), internet banking and e-money services. Meanwhile back-office operations have been transformed by the adoption of new internal systems, such as customer relationship management and business management technologies, core processing technologies and various support and integration technologies. However, these innovations often involve large set-up costs relative to marginal costs hence the impact of technological advance is not always cost saving. Also, even if technology reduces costs, revenues may adversely be affected (customers may be unhappy with new technologies and demand less services).

The usual measure for bank efficiency is the cost-to-income ratio. In the 1980s and 1990s a cost-income ratio of around 70% was considered excessive and an indication of a badly run bank. By the mid-2000s, a ratio under 60% was considered respectable, but high performers are nowadays expected to have ratios below the 50% benchmark. While bankers and analysts tend to focus on this efficiency metric, academics have used more sophisticated modelling techniques to derive efficiency scores for banks. These more technical measures can be obtained via parametric or non-parametric statistical approaches and have the advantage in that they allow one to control for different output and input features of banks. Berger and Humphrey (1997) review 133 of such studies and find that large banks are more efficient than their smaller counterparts, and cost savings that can be had from emulating best practice are typically much bigger than gained from bigger size (scale economies) or via product diversification (scope economies). Fethi and Pasiouras (2010) update the aforementioned review focusing on 196 non-parametric bank efficiency studies between 1998 and 2009. They show that research attention in the bank efficiency area has focused on investigating: its determinants; bank ownership; mergers and acquisitions; its link to stock returns; regulatory reform and bank branches (also see Paradi and Zhu (2013)). One interesting trend in the literature is to see whether European integration has improved bank efficiency. Using both parametric and non-parametric modelling approaches Casu and Girardone (2010) find that bank efficiency has generally improved as a result of greater European integration (a finding also confirmed by Ferreira (2011)).

10.4. PRODUCTIVITY AND PROFITABILITY

There is an extensive literature investigating the productivity of European banks of which the evidence is somewhat mixed. Altunbas *et al.* (1999), for instance, finds that technical change systematically reduced EU banks' total costs during the 1990s whereas Battese *et al*'s (2000) study of Swedish banks finds that technical change became exhausted with 'average' banks catching up with industry best practice. Casu *et al.* (2004) estimate productivity change in European banking during the 1990s to find that some countries benefited from productivity growth while others did not. A fair number of studies have also found that deregulation typically has a negative impact on bank productivity (Lozano-Vivas (1998); Canhoto and Dermine (2003)) and this is a somewhat surprising result as studies outside the US and Europe tend to find that liberalization boosts bank productivity. Fiorentino *et al.* (2010) investigate whether consolidation and privatization fostered productivity growth among Italian and German banks during the period 1994-2004 and find improvements in productivity in both countries. The conflicting productivity results are because of assumptions relating to

common production frontiers across countries and banks, as well as uniform operating environments. Koetter and Poghosyan (2009) identify two main types of systematic differences across and within national banking markets. The first type of heterogeneity pertains to the environment in which banks operate and is exogenous to managers, although it affects their choice of available technology. The second type relates to managerial choices and therefore affecting efficiency and productivity estimates. Recent studies have sought to deal with such cross-country heterogeneity (Kontolaimou and Tsekouras (2010)). Casu *et. al.* (2012) investigate the total factor productivity growth of commercial banks in nine Eurozone countries between 1992 and 2009 using a parametric metafrontier Divisia index which allows for technology heterogeneity and the identification of technology gaps among different countries. The main finding is that while technical improvements have occurred, not all banking systems benefit. In the case of convergence, all banking systems are gradually moving towards the best available technology. The speed of convergence accelerates after the introduction of the single currency, before falling after the 2007 crisis.

There have also been substantial variations in the average profitability of banks located in different EU countries. Table 10.2 highlights the relatively low profitability of German banks during the early and mid-2000s, when banks in Belgium, Sweden and UK enjoyed relatively high average profitability. Differences in average profitability between countries have been attributed to the following: variation in accounting and tax systems; structural factors such as the intensity of competition in specific product segments; the extent of product and geographic diversification; and business cycle effects (Llewellyn (2005); Carbo and Rodriguez (2007); Goddard *et al.* (2007, 2013)).

Since the banking crisis there has been much discussion in academic and policy circles as to what type of bank or business model will yield the safest and most profitable banking system. Liikanen (2012) finds that although different bank business models (retail vs. investment banking) were adversely affected by the crisis it seems that the 'less resilient' were those that depended more on: short-term wholesale funding; excessive leverage; excessive trading/derivative/market activity; poor lending due to aggressive credit growth; and weak corporate governance.

10.5. THE CRISIS

The financial crisis first affected European banking in the summer of 2007, when a small German lender IKB Deutsche Industriebank, got into difficulty when the portfolio of assets held by one of its structured investment vehicles (an SIV known as Rheinland) failed. (Also see Chapter 12 for more detail on the crisis). This

Table 10.2: Average profitability (% return on equity) of EU-15 national banking sectors, 1990 to 2011

Country	1990-94	1995-99	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Belgium	9.57	14.54	20.48	15.90	11.76	16.07	14.03	17.11	19.46	9.94	-1.74	6.89	10.48	1.36
Germany	12.97	12.48	7.86	0.84	-1.71	-2.70	2.26	8.33	11.02	4.79	2.87	3.57	15.2	2.16
Greece	24.60	21.16	19.21	11.80	7.71	14.01	11.54	10.86	13.93	11.44	2.86	-1.95	-4.73	5.88
Spain	9.73	10.40	10.37	12.30	12.65	13.35	14.60	8.94	15.22	11.53	8.65	1.74	8.04	0.09
France	6.18	7.36	12.08	10.94	9.38	9.85	13.43	9.54	14.77	9.47	5.80	8.36	8.35	5.59
Ireland	n/a	19.80	17.88	10.77	11.90	14.50	18.30	12.46	17.84	7.07	-0.16	-49.97	-65.22	-11.12
Italy	11.14	9.29	17.58	8.42	6.44	7.59	11.45	8.17	10.50	8.74	6.75	3.47	3.68	-12.99
Luxembourg	12.73	21.87	20.51	12.89	10.62	13.73	9.88	12.79	19.22	10.99	2.10	8.24	8.47	6.17
Netherlands	13.99	15.92	17.19	12.39	9.75	14.73	19.50	14.14	16.96	18.63	11.43	9.41	7.54	6.16
Austria	8.13	9.17	11.33	7.85	7.83	9.50	10.49	10.91	16.31	7.81	1.60	1.63	6.41	1.47
Portugal	10.07	7.78	8.84	13.43	12.30	13.44	11.40	8.04	13.40	9.07	7.68	4.57	6.70	-4.09
Finland	-21.57	8.05	22.07	22.79	8.40	18.11	12.12	7.36	10.92	6.71	1.23	7.92	6.96	8.11
Sweden	17.09	18.42	19.50	18.85	13.39	15.34	18.45	11.07	15.70	9.60	3.56	9.98	10.18	10.65
UK	15.40	27.88	21.49	13.47	11.59	14.43	19.90	9.84	16.10	12.59	10.38	4.37	4.37	4.24
Denmark	-2.77	15.70	15.24	10.23	11.26	15.75	16.46	12.06	16.84	9.00	-12.36	-6.90	2.39	0.60

Source: Constructed from Bankscope and ECB Consolidated Banking Data

prompted a state-led rescue. Liquidity within the banking system evaporated, and overnight interest rates increased dramatically. A rapid injection of liquidity into the euro area banking system was effective in averting the danger of a major bank failure. However, the outlook deteriorated dramatically in September 2008 following the collapse of the US investment bank Lehman Brothers, and the agreed takeover of another US investment bank, Merrill Lynch, by Bank of America. The Federal Reserve then announced an USD 85 billion rescue package for the large insurer AIG, in return for an 80% stake. The US bank Washington Mutual was closed and its remaining assets sold to JP Morgan Chase. The US Federal Housing Finance Agency nationalized the government-sponsored mortgage finance enterprises, Federal National Mortgage Association (Fannie Mae) and Federal Home Loan Mortgage Corporation (Freddie Mac). These events created a crisis of confidence that brought the US and European banking systems perilously close to the brink of collapse in September and October 2008.

As one would expect, the European banking system was severely impacted by the ensuing credit crisis. From 2007 to 2010, the largest European banks reported huge credit losses, and received massive capital injections (see Table 10.3) with major UK and Swiss banks being the biggest casualties. Heavy write downs have been matched by massive capital-raising. Since October 2008 the capitalization of many of Europe's largest banks has also been further bolstered through injections of public funding predominantly through government purchase of preference shares and other quasi equity instruments.

In response to the crisis, every European government has announced a combination of loan guarantee schemes, bank rescue plans and fiscal stimulus packages in an attempt to preserve their banking systems and averting potential damaging recessionary consequences. (Stolz and Wedow (2010); ECB (2011)).

Table 10.3: European bank write downs and capital raised until December 2010

Rank	Name	Country	Write down & losses USD billion	Capital USD billion
1	Royal Bank of Scotland Group Plc	UK	75.9	97.8
2	UBS AG	Switzerland	58.4	51.1
3	HSBC Holdings Plc	UK	56	28.8
4	Barclays Plc	UK	44.8	31.6
5	Banco Santander SA	Spain	30.2	29.4
6	HBOS Plc	UK	29.5	25.7
7	UniCredit SpA	Italy	27.9	15.9
8	Credit Suisse Group AG	Switzerland	27.4	22.3
9	Deutsche Bank AG	Germany	24.5	28.9
10	BNP Paribas	France	24	13.6
11	ING Groep N.V.	Netherlands	19.8	24.6

Table 10.3: European bank write downs and capital raised until December 2010 *(continued)*

Rank	Name	Country	Write down & losses USD billion	Capital USD billion
12	Société Générale	France	19.5	17.8
13	Bayerische Landesbank	Germany	19.3	21.4
14	Commerzbank AG	Germany	17.1	26.3
15	KBC Groep NV	Belgium	15	7.9
16	IKB Deutsche Industriebank AG	Germany	14.8	11
17	Allied Irish Banks Plc	Ireland	13	18
18	Banco Bilbao Vizcaya Argentaria	Spain	12.7	0
19	Danske Bank A/S	Denmark	10.8	0
20	Credit Agricole S.A.	France	9.9	12.9
21	Intesa Sanpaolo	Italy	9.7	5.8
22	Fortis	Belgium	9.4	23.2
23	Natixis	France	9	8.3
24	Landesbank Baden-Wurttemberg	Germany	8	7.2
25	DZ Bank AG	Germany	7.8	0
26	Anglo Irish Bank Corp	Ireland	7.6	4.4
27	Hypo Real Estate Holding AG	Germany	7.2	11.2
28	Dexia SA	Belgium	7	9.2
29	Erste Group Bank	Austria	6.1	3
30	Dresdner Bank AG	Germany	5.2	0
31	Banco Popolare	Italy	4.5	0
32	HSH Nordbank AG	Germany	4.2	1.8
33	National Bank of Greece SA	Greece	4.1	0.8
34	Bank of Ireland	Ireland	4.1	11.7
35	WestLB AG	Germany	4	7.2
36	EFG Eurobank	Greece	3.9	0
37	Lloyds Banking Group Plc	UK	3.6	51.2
38	Banco Popular Espanol SA	Spain	3.6	1.7
39	Rabobank	Netherlands	3.5	1.5
40	Northern Rock PLC	UK	3.3	5.6
41	Alliance & Leicester Plc	UK	2.6	0
42	Landesbank Sachsen AG	Germany	2.5	0
43	Deutsche Postbank AG	Germany	2.5	1.4
44	ABN AMRO Holding NV	Netherlands	2.3	0
45	Alpha Bank	Greece	2.1	0
46	Bradford & Bingley PLC	UK	2.1	3.1
47	Piraeus Bank	Greece	2	0
48	Groupe Caisse d'Epargne	France	1.2	5.2
49	Landesbank Hessen-Thueringen	Germany	0.8	0
50	HVB Group	Germany	0.7	0

Source: Bloomberg

Since this wave of government-backed bank bailouts, recapitalization plans, liquidity injections, and credit guarantee schemes there have been widespread policy worries about the current business models pursued by European banks. Large scale banking rescues have raised concerns about the social and economic costs of 'Too-Big-To-Fail' (TBTF) or 'Too Systemically Important to Fail'. Some small banks such as the UK's Northern Rock were rescued because it was perceived by policymakers to be of systemic importance. An important question for policy makers is whether limits should be placed on bank size, growth or concentration, to minimize the moral hazard concerns raised by banks having achieved TBTF or related status. Beside the actions of national governments, the European Commission has issued several communications concerning aspects of the crisis: the application of state aid rules to the banking sector; the treatment of banks' impaired assets; the recapitalisation of financial institutions; and the provision of restructuring aid to banks. Many of the regulatory or supervisory frameworks for dealing with problems in the financial system at an EU level were found to be lacking (Fonteyne *et al.* (2010)). National approaches to crisis management and depositor protection were inadequate, and had adverse spillover effects on other EU member states. There was also a lack of co-operation and agreement over arrangements for sharing the burden of fiscal costs arising from the crisis. Clearly, governments and their respective regulators have moved rapidly to close the gaps and weaknesses in the system for bank regulation and supervision. (The passing of the U.S. Dodd-Frank Wall Street Reform and Consumer Protection Act in July 2010, the biggest financial reform in the U.S since the Great Depression, is a good reflection of this trend, and is also indicative of the type of measures that national governments are adopting). Effective regulation has also been constrained by a lack of transparency concerning banks' business models. While the crisis has forced banks to provide detailed information on their exposures, disclosure of business models, risk management and valuation practices remain limited. Likewise, the restoration of confidence in over the counter (OTC) markets for securitized assets and credit derivatives will require increased transparency, reduced complexity and improved oversight.

10.6. COMPETITION, REGULATION AND STABILITY

Competition in European banking appears to have become more intense during the 2000s, as barriers to product and geographic diversification have been reduced or eliminated. Competition has prompted banks to make efficiency savings and as noted earlier, encouraged them to diversify into non-traditional activities such as insurance and mutual funds, private banking and asset management. Prior to the credit crisis of 2007 and 2008 the securitization of European banks' loans portfolios had been proceeding rapidly. Securitization issues amounted to EUR

496 billion in 2007, of which over 50% related to residential mortgages (European Securitisation Forum (2008)). Meanwhile insurance companies and investment and pension funds encroached into territory previously occupied by banks, as household savings were siphoned towards alternative savings and investment products. By the end of the 2000s, non-bank institutions such as supermarkets and telecommunications firms competed in financial services markets.

Regulatory developments post-crisis have been significant with the main aim of bolstering capital and liquidity strength in the banking system as well as introducing regulations that seek to limit bank risk-taking behaviour. (Also see Chapter 7 for more detail on regulatory initiatives post-crisis). In addition, market participants as well as regulatory agencies are increasingly scrutinising bank performance to ensure that the financial strength of major institutions hits acceptable benchmarks. Table 10.4 illustrates the ECB estimates of the performance of large and complex banking groups in the Euro Area between 2005 and 2010 highlighting the disastrous losses made in 2008 and small pick-up in ROE thereafter. Note the colossal increase in cost-income ratios in 2008 due to a collapse in income. Also witness the substantial increase in Tier 1 capital and solvency ratios in 2009 and 2010. Another good example of performance scrutiny relates to the stress tests reported by the European Banking Authority (EBA). The most recent being those published on the 15th July 2011 that cover 90 banks operating in 21 European countries. For this exercise the EBA allowed specific capital increase in the first four months of 2011 to be included in their calculations. This provided an incentive for banks to boost solvency prior to the tests. The main findings can be summarised as follows:

- by December 2010 twenty banks would not have achieved the benchmark 5% Tier 1 capital ratio over the two-year horizon – 2010-2012 of the exercise. This amounts to a capital shortfall of some EUR 26.8 billion;
- the 90 banks in question raised an additional EUR 50 billion between January and April 2011;
- eight banks did not achieve the 5% capital threshold amounting to a shortfall of EUR 2.5 bn:
- 16 banks achieved a Tier 1 ratio of between 5% and 6%.

On the basis of these findings the EBA issued a formal recommendation to national supervisory authorities stating that banks that have Tier 1 capital below the 5% threshold should remedy the situation as soon as possible. In addition the EBA has also recommended that' national supervisory authorities request all banks whose Tier 1 ratio is above but close to 5%, and that have sizeable exposures to sovereigns under stress, to take specific steps to strengthen their solvency, including (where necessary), restrictions on dividends, deleveraging, issuance of fresh capital or conversion of lower-quality instruments into Core Tier 1 capital.

Table 10.4: Performance of Large & Complex Banking Groups in the Euro Area

Year	Return on Equity (%)		Impaired Loans/ Total Assets (%)		Cost-Income Ratio (%)		Tier 1 Ratio (%)		Solvency Ratio (%)	
	Median	Average	Median	Average	Median	Average	Median	Average	Median	Average
2005	10.04	11.93	0.08	0.11	60.69	58.87	7.89	8.20	11.05	11.23
2006	14.81	14.61	0.07	0.11	5595	56.40	7.75	8.07	11.01	11.16
2007	11.97	11.65	0.05	0.10	63.00	62.95	7.40	7.72	10.60	10.72
2008	2.26	-14.65	0.27	0.31	73.36	160.96	8.59	8.58	11.70	11.37
2009	2.97	0.34	0.45	0.55	60.35	62.47	10.15	10.33	13.60	13.37
2010	7.68	6.76	0.24	0.32	60.40	62.01	11.20	11.38	14.10	14.38

Source: Adapted from ECB, Financial Stability Review, June 2011, Table S5, page S30-S31.

Various commentators have suggested that the stress tests performed were not tough enough (especially as the extra EUR 50 billion raised in the first quarter of 2011 was included). Other scenarios have been reported by various analysts. For instance, Goldman Sachs (2011) makes various assumptions about bank sovereign debt exposures and applying a haircut to the debt of Greece, Ireland, and Portugal. This they find would yield a bank capital shortfall of EUR 25.9 billion relative to the 5% Core Tier 1 capital benchmark. Applying a further 10% haircut to Italian and Spanish debt would see the shortfall increase to EUR 29.8 billion. On a more positive note, Barclays (2011) estimated that only four of the top 30 banks would fail the 5% hurdle when applying mark-to-market also to the banking book.

A serious on-going concern, of course, relates to how the sovereign debt crisis will impact bank funding costs over the coming months. It is well known that funding costs are positively linked to sovereign risks (see IMF 2011, and BIS 2011). An increase in such risk leads to a higher spread *vis-à-vis* the typical risk-free asset in Europe, the German Bund and this in-turn increases the cost of servicing liabilities (especially as bonds comprise a substantial proportion of such liabilities). The aforementioned stress tests revealed that in December 2010, the 90 banks under study had EUR 8.2 trillion of wholesale/interbank funding, of which around 56% matures in two years. Replacing this funding is going to be a major challenge in the light of the on-going sovereign debt crisis. In fact, the recent ECB Financial Stability Report (ECB 2011) cautions about this growing risk.

Banks are increasingly looking to strengthen their capital and liquidity positions in the light of both regulatory (Basel III) and market demands and this, they argue, is impacting their lending ability and profits. While politicians throughout Europe press for increased lending, particularly to the small business sector, banks continue to constrain and shrink credit (particularly in countries most hit by the sovereign debt crisis including the UK). Bankers argue that they cannot boost capital while substantially extending credit in a recessionary environment

given the regulatory capital charges required. Banks are finding it too costly and therefore difficult to issue new capital so (they argue) the only way they can boost capital is to refrain from capital costly activity – so they are cutting lending, selling or shrinking capital costly investment banking and other businesses. While there is significant debate as to whether equity capital is too costly – the famous Modigliani-Miller theorem argues that in markets in which risk is priced correctly, more equity financing reduces the required return on equity in a way that, assuming no preferential tax treatment on debt and other frictions, leaves the total funding costs of the bank the same. This is why some argue that costly equity is a myth for banks post-crisis (Admati *et al.* (2010)). Unfortunately the reality is that banks are not issuing more equity capital in a big way and regulatory and other pressures are constraining their ability to lend.

Recent turmoil in the global financial system has also highlighted the failure of investors, depositors, and supervisors to appropriately discipline banks and this has led to a re-consideration of the links between bank performance, stability and changes in the competitive environment. Two views are posited in the literature. The first, known as the competition-fragility (charter or franchise value) view, argues that banks earn monopoly rents in less competitive markets resulting in higher profits, capital ratios and charter values. This makes them better placed to withstand demand- or supply-side shocks and discourages excessive risk-taking (Allen and Gale (2004)). The second, the competition-stability view, argues that competition leads to less fragility. This is because in concentrated banking systems with low levels of competition, the market power of incumbent banks results in higher interest rates for borrowers making it more difficult for them to repay loans. Such high interest rates increase the incentives for borrowers to take on greater risk in search of higher returns. This increases the possibility of the non-repayment of loans and the default risk of bank portfolios making the financial system less stable (Boyd and DeNicolo (2005)). Big banks are often deemed to be Too-Big, Too-Inter-Connected or Too-Complex-To-Fail and thus they obtain implicit (or explicit) subsidies via government safety nets. This may further increase moral hazard and encourage large banks to take-on excessive risks leading to financial instability (Demirgüç-Kunt and Huizinga (2010)).

Empirical evidence in support of the competition-fragility and competition-stability views is rather mixed. (Boyd *et al.* (2006); DeNicolo and Loukoianova (2006); Jiménez *et al.* (2010)). Uhde and Heimeshoff (2009) show that national banking market concentration has a negative impact on European banking system stability. Berger *et al.* (2009) use a variety of risk and competition measures from banks operating in 23 countries. The results provide limited support to both the competition-fragility and competition-stability views in that market power increases credit risk, but banks with greater market power face lower market risks. Martinez-Miera and Repullo (2009) also suggest a non-linear relationship between bank competi-

tion and stability. Heightened competition may reduce borrower's probability of default (risk-shifting effect), but it may also reduce the interest payments from performing loans, which serves as a buffer to cover loan losses (margin effect). They find evidence of a U-shaped relationship between competition (measured by the number of banks) and bank stability. In highly concentrated markets the risk-shifting effect dominates and more competition reduces bank risk, while in very competitive markets the margin effect dominates and increased competition erodes bank's franchise value and hence increases risks. Liu *et al.* (2013) find evidence of a U-shaped relationship in European banking over 2000 and 2008.

10.7. SUMMARY

European banking has experienced remarkable change over the last 50 years. Technological advances, innovation and deregulation have resulted in major developments in the organization and delivery of financial services. Banking business has become more competitive, with the cosy cartels of the 1950s and 1960s blown away to create a more competitive environment. Demarcation lines between various types of bank and financial service providers have been eroded and throughout Europe there has been increased cross-border activity and integration. This latter trend has probably had its biggest impact on the provision of wholesale banking services, retail banking (including SME services) remain firmly entrenched at the national level. Banks have adopted more sophisticated business models and diversified into new product areas and services in order to pool risk, and benefit from potential scale, scope and other efficiencies.

These broad trends have resulted in a decline in the number of banks and a general increase in concentration. Product diversification has also sought to boost non-interest income as traditional margin income fell, although the evidence suggests that this resulted in increased volatility in bank profits. Coupled with a change in income composition there has also been a drive to improve operational efficiency and productivity – with mixed results. There is, at least some evidence that integration of European banking systems has led to some productivity gains. The 2007-8 financial crises has been a major shock to the system, with large government interventions in many countries and significant on-going regulatory reform aimed at boosting capital, liquidity and curtailing excessive risk-taking. It is unclear as to what the ultimate impact of this reform will be on the performance of European banks – although it seems likely that reform will lead to a more conservative and less competitive system.

REFERENCES

ADMATI, A.R., DEMARZO, P.M., HELLWIG, M.F. and PFLEIDERER, P., 2010, "Fallacies, Irrelevant Facts, and Myths in the Discussion of Capital Regulation: Why Bank Equity is *Not* Expensive", *Rock Center for Corporate Governance at Stanford University Working Paper* No. 86 and also *Max Planck Institute for Research on Collective Goods Working Paper* No. 2010/42.

ALLEN, F. and GALE, D., 2004, "Competition and financial stability", *Journal of Money, Credit, and Banking* 36, 433-80.

ALTUNBAS, Y., GODDARD, J. and MOLYNEUX, P., 1999, "Technical change in banking", *Economics Letters* 64, 215-221.

BARCLAYS CAPITAL, 2011, "Life goes on. The European stress test", *Barclays Capital Equity Research*, 18 July.

BATTESE, G.E., HESHMATI, A. and HJALMARSSON, L., 2000, "Efficiency of labour use in the Swedish banking industry: A stochastic frontier approach", *Empirical Economics* 25, 623-640.

BERGER, A.N. and HUMPHREY, D.B., 1997, "Efficiency of financial institutions: International survey and directions for further research", *European Journal of Operational Research* 98, 175-212.

BERGER, A.N., KLAPPER, L.F. and TURK-ARISS, R., 2009, "Bank competition and financial stability", *Journal of Financial Services Research* 35, 99-118.

BIS, 2011, "The Impact of Sovereign Credit Risk on Bank Funding Conditions", *Committee on the Global Financial System*, Basel, July 2011.

BOOT, A.W.A. and SCHMEITS, A., 2000, "Market discipline and incentive problems in conglomerate firms with applications to banking", *Journal of Financial Intermediation* 9, 240-273.

BOYD, J. and DENICOLO, G., 2005, "The theory of bank risk taking revisited", *Journal of Finance* 60, 1329-1343.

BOYD, J., DENICOLO, G. and JALAL, A.M., 2006, "Bank risk taking and competition revisited: new theory and evidence", *IMF Working paper* 06/29, Washington DC, IMF.

BRITISH BANKERS ASSOCIATION, 2012, *Annual Abstract of Statistics*, 29, London, BBA.

BRUNNERMEIER, M., DONG, G. and PALIA, D., 2012, "Banks' non-interest income and systemic risk", *Working Paper*, January.

BUCH, C.M. and DELONG, G.L., 2010, "Banking globalization: International consolidation and mergers in banking", Chapter 20, Eds. A.N. BERGER, P. MOLYNEUX and J.O.S. WILSON, *Oxford Handbook of Banking*, Oxford, OUP, 508-530.

CANHOTO, A. and DERMINE, J., 2003, "A note on banking efficiency in Portugal, new vs. old banks", *Journal of Banking and Finance* 27, 2087-2098.

CARBO, S. and RODRIGUEZ, F., 2007, "The determinants of bank margins in European banking", *Journal of Banking and* Finance 31, 2043-2063.

CASU, B., GIRARDONE, C. and MOLYNEUX, P., 2004, "Productivity change in European banking: A comparison of parametric and non-parametric approaches", *Journal of Banking and Finance* 28, 2521-2540.

CASU, B. and GIRARDONE, C., 2010, "Integration and efficiency convergence in EU banking markets", *Omega* 38, 260-267.

CASU, B., GIRARDONE, C., FERRARI, A. and WILSON, J.O.S., 2012, "Integration, productivity and technological spillovers: Evidence for eurozone banking industries", October 1, 2012. Available at SSRN: http://ssrn.com/abstract=1879963 or http://dx.doi.org/10.2139/ssrn.1879963.

DEMIRGÜÇ-KUNT, A. and HUIZINGA, H., 2010, "Are banks too-big-too fail or too big to save? International Evidence from equity prices and CDS spreads", *World Bank Policy Research Paper* Number 5360, Washington DC, World Bank.

DENICOLO, G. and LOUKOIANOVA, E., 2006, "Bank ownership, market structure, and risk", *IMF Working Paper*, 07/125, Washington DC, IMF.

DERMINE, J., 2006, "European banking integration: Don't put the cart before the horse", *Financial Institutions, Markets and Money* 15, 57-106.

EUROPEAN CENTRAL BANK, 2000, "EU banks' income structure", *Banking Supervision Committee*, April, Frankfurt, ECB.

EUROPEAN CENTRAL BANK, 2006, *EU banking structures,* September, Frankfurt, ECB.

EUROPEAN CENTRAL BANK, 2007, *EU banking structure,* September, Frankfurt, ECB.

EUROPEAN CENTRAL BANK, 2010, *EU Banking Structures*, September, Frankfurt, ECB.

EUROPEAN CENTRAL BANK, 2011, *Financial Stability Review*, June, Frankfurt, ECB.

EUROPEAN CENTRAL BANK, 2012, *Financial Stability Review*, June, Frankfurt, ECB.

EUROPEAN SECURITISATION FORUM, 2008, *ESF Securitisation Data Report, Winter*. London, European Securitisation Forum.

FERREIRA, C., 2011, "Efficiency and integration in European banking markets", Available at SSRN: http://ssrn.com/abstract=1930264 or http://dx.doi.org/10.2139/ssrn.1930264.

FETHI, M.D. and PASIOURAS, F., 2010, "Assessing bank efficiency and performance with operational research and artificial intelligence techniques: A survey", *European Journal of Operational Research* 204, 189-198.

FIORENTINO, E., DE VINCENZO, A., HEID, F., KARMANN, A. and KOETTER, M., 2009, "The effects of privatization and consolidation on bank productivity: Comparative evidence from Italy and Germany", *Deutsche Bundesbank Discussion Paper,* Series 2 Banking and Financial Studies, Number 03/2009, Frankfurt, Deutsche Bundesbank.

FONTEYNE, W. BOSSU, W., CORTAVARRIA-CHECKLEY, L., GIUSTINIANI, A., GULLO, A., HARDY, D. and KERR, S., 2010, "Crisis Management and Resolution for a European Banking System", *IMF Working Papers*, WP/10/70, Washington DC, IMF.

GODDARD, J., MOLYNEUX, P. and WILSON, J.O.S., 2001, European Banking: Technology, *Efficiency and Growth*, London, John Wiley and Sons.

GODDARD, J., MOLYNEUX, P., WILSON, J.O.S. and TAVAKOLI, M., 2007, "European banking: an overview", *Journal of Banking and Finance* 31, 1911-1936.

GODDARD, J., MOLYNEUX, P. and WILSON, J.O.S., 2010, "Banking in the European Union", Chapter 32, Eds. A.N. BERGER, P. MOLYNEUX and J.O.S. WILSON, *Oxford Handbook of Banking*, Oxford, OUP, 777-806.

GODDARD, J., LIU, H., MOLYNEUX, P. and WILSON, J.O.S., 2013, "Do bank profits converge?", *European Financial Management*, forthcoming.

GOLDMAN SACHS, 2011, "Stress Test II: Banks not buckling under EBA's Stress: Focus moving to connectivity", *Goldman Sachs Equity Research*, 18 July, London, Goldman Sachs.

IMF, 2011, *Global Financial Stability Report*, April 2011, Washington DC, IMF.

JIMÉNEZ, G., LOPEZ, J. and SAURINA, J., 2010, "How does competition impact on bank risk taking?", *Banco De Espana Working Paper,* 1005, Madrid, Banco de Espana.

KOETTER, M. and POGHOSYAN, T., 2009, "The identification of technology regimes in banking: Implications for the market power-fragility nexus", *Journal of Banking and Finance* 33, 1413-1422.

KONTOLAIMOU, A. and TSEKOURAS, K., 2010, "Are cooperatives the weakest link in European banking? A non-parametric metafrontier approach", *Journal of Banking and Finance* 34, 1946-1957.

LAEVEN, L. and LEVINE, R., 2007, "Is there a diversification discount in financial conglomerates?" *Journal of Financial Economics* 85, 331-367.

LEPETIT, L., NYS, E., ROUS, P. and TARAZI, A., 2008, "The expansion of services in European banking: Implications for loan pricing and interest margins", *Journal of Banking and Finance* 32, 2325-2335.

LIIKANEN, E., 2012, *High-level Expert Group on Reforming the Structure of the EU Banking Sector*, Brussels, 2 October 2012.

LIU, H., MOLYNEUX, P. and WILSON, J.O.S., 2013, "Competition and stability in European banking: A regional analysis", *Manchester School*, forthcoming.

LLEWELLYN, D.T., 2005, "Competition and profitability in European banking: Why are UK banks so profitable?", *Economic Notes* 34, 279-311.

LOZANO-VIVAS, A., 1998, "Efficiency and technical change for Spanish banks", *Applied Financial Economics* 8, 289-300.

MARTINEZ-MIERA, D. and REPULLO, R., 2009, "Does competition reduce the risk of bank failure?", *Centre for Economic Policy Research Working Paper*, DP6669, London, CEPR.

OECD, 1985, *Trends in Banking in OECD Countries*, Committee on Financial Markets, Expert Group on Banking, Paris, OECD.

PAPADEMOS, L., 2005, "Banking supervision and financial stability in Europe", Speech delivered to a *Conference on Supervision of International Banks*, European Banking Federation, Brussels, 28 October 2005.

PARADI, J.C. and ZHU, H., 2013, "A survey on bank branch efficiency and performance research with Data Envelopment Analysis", *Omega* 41, 61-79.

PECCHIOLI, R.M., 1983, *The Internationalisation of Banking: Policy Issues*, Paris, OECD.

STIROH, K., 2004, "Diversification in banking: Is non-interest income the answer?", *Journal of Money, Credit and Banking* 36, 853-882.

STIROH, K. and RUMBLE, A., 2006, "The dark side of diversification: The case of US financial holding companies", *Journal of Banking and Finance* 30, 2131-2161.

STOLZ, S.H. and WEDOW, M., 2010, "Extraordinary measures in extraordinary times – public measures in support of the financial sector in the EU and the United States", *ECB Occasional Paper Series*, No. 117, Frankfurt: ECB.

UHDE, A. and HEIMESHOFF, U., 2009, "Consolidation in banking and financial stability in Europe: empirical evidence", *Journal of Banking and Finance* 33, 1299-1311.

11. Shadow Banking and New Lending Channels – Past and Future

Patricia Jackson[1]

11.1. Introduction

The history of shadow banking is one of shifts in the type of institution involved, and rate growth, but there are two common elements across the decades. Shadow banking has caused or been at the heart of various financial crises in different periods and one important factor behind its growth has been the style and extent of bank regulation. In the 1970s and 1980s the growth in shadow banking (then called secondary banking or non-bank banking) tended to be related to property lending and, even though it was not complex, the crises were sufficiently severe to require central bank/ government intervention. The 1990s steadily saw more and more complex structures being used in shadow banking peaking in 2007/8 and being central to the financial crisis. The Financial Stability Board (FSB) estimates that the size of the global shadow banking system grew from USD 26 trillion in 2002 to USD 62 trillion in 2007 (FSB (2012a)). One question is what lies ahead. The Basel III capital and liquidity buffers and wider uncertainty regarding future regulatory change have led to deleveraging and this in turn is leading shadow banking again to grow. The FSB (2012a) indicates that after falling slightly in 2008 shadow banking assets have now grown above 2007 levels[2] but the market is focused more on traditional banking products than was the case pre-crisis. There has also been a proliferation of different types of lending channel. This chapter looks at the growth of shadow banking and the causes over the past four decades and looks forward at the way the industry could develop and the risks this could pose[3].

11.1.1. Definition of Shadow Banking

The FSB (2012b) defined the shadow banking system as 'credit intermediation involving entities and activities (fully or partially) outside the regular banking system' but shadow banking is almost certainly broader than this. The Institute of International Finance (IIF) (2012a) sees shadow banking in relation to the

[1] I thank my Ernst and Young colleagues for comments, in particular Mark London, Gareth Mee and David King, but the opinions are mine and may not reflect those of Ernst & Young.

[2] This was calculated by aggregating flow of funds data for the major markets covering 'other financial intermediaries'.

[3] Chapter 9 of this volume covers the evolution of bank business models.

three core activities of banks – taking highly liquid deposits, extending credit and providing a payments system. They also point out that in modern financial systems the core activities of banks are often 'disaggregated, supplanted or supplemented and/or complemented by activities provided by the non-bank financial system.' As the IIF paper says 'non-bank financial intermediation activities have existed in some form or other since the origins of modern finance'; this is driven by a range of different factors. One aspect undoubtedly has been regulation of banks or light or non-existent regulation of shadow banks which has encouraged the development of non-banking financial activities. Jackson *et al*. (1999) sets out the effect of Basel I capital requirements for banks on the development of the securitisation market. Other rule-based constraints also provided the impetus. In the US the development of money market mutuals was driven by the need for methods of cash management which protected the placer of the funds from the default of the counterparty. This is because deposits in banks were only insured up to a limit and deposits over the limit could be placed in money market mutuals and secured by high quality liquid assets. Other non-regulatory factors have also been important. Pozsar *et al*. (2010) suggest that in cases such as non-bank finance companies, specialisation and greater efficiency are important aspects behind their growth. The role of banks in the development of aspects of the shadow banking system should not be underestimated – the banks were intrinsically intertwined in the securitisation market.

11.2. SHADOW BANKING BEFORE THE 2007-2008 CRISIS

11.2.1. Non-bank Banks

In the 1970s and 1980s institutions carrying out banking-type activities, but which were more lightly regulated than banks or in some cases unregulated, were at the centre of crises in different countries. In the UK fringe banks developed from the 1960s. Credit controls applied at the time could only be imposed on recognised banks and on the principal instalment credit finance houses (Bank of England (1974)). Uncontrolled deposit takers became established and 'flourished as a fringe'. When the controls were lifted in 1971 the fringe companies continued lending, taking advantage of a property boom and consumer credit expansion. The established banks supported this by providing standby and other facilities. By summer 1973 public deposits had reached GBP 800 million with the fringe banks, which were outside any banking supervision. They were not banks and the Bank of England lacked effective power over them. In the latter half of 1973 there was sudden loss of confidence in the sector and a crisis ensued. This led to a broadening in the scope of banking supervision.

A similar pattern was seen with Savings and Loans (S&Ls) institutions in the US. S&Ls were more lightly regulated than banks although they faced restrictions on activity. Between 1966 and 1979 interest rates fluctuated sharply and the S&Ls, with fixed-rate mortgages and unhedged interest rate risk, sustained income effects as funding costs rose. Business diversification as a result of deregulation took them into high risk areas such as junk bonds leading to widespread failures.

Another financial crisis where non-banks played a significant role was Japan in the early 1990s. There had been rapid expansion of their role in financial intermediation particularly focussed on real estate exposures. Financial liberalisation in the 1980s had enabled expansion of housing finance and lifting of restrictions on non-banks enabled them to supply a rising proportion of property related funding. With non-bank banks themselves funded by banks, this was in part a way of bypassing credit ceilings on bank real estate loans put in place by the authorities. The collapse of real estate prices in the 1990s led to wide spread problems (Kawai (2003)).

11.2.2. Money Market Funds

In the USA, a different type of shadow bank grew up in the form of money market funds (a type of mutual fund) established in response to various regulatory limits on banks. The first money market fund was established in 1971 to avoid regulation which limited bank deposit rates. Money market funds effectively acted as interest bearing current deposit accounts, taking customer funds and investing them in highly liquid assets. At first there was very limited regulation.

The role of money market funds evolved over time as Schapiro (2012) sets out – "facilitating efficient cash management for both retail and institutional investors who used them for everything from making mortgage payments... to the short term investment of cash received through business operations". In effect they provided an important way of getting security on deposits above the deposit protection ceiling. The amount of assets in money market funds grew from under USD 100 million in 1990 to almost USD 4 trillion just before the 2008 financial crisis, (Schapiro (2012)).

The growth was fuelled by the attraction of what were perceived as riskless demand accounts (including cheque books) paying yields above risk free rates. By 2008 two thirds of funds came from institutions. To offer higher yields money market funds increasingly invested in structured products. A key part of the perception of safety was that they would not break the buck. Funds were re-valued daily and investors were given USD 1 shares to reflect the value of the fund. The expectation was that investors would always receive the dollar value. There was implicit sponsor support to prevent breaking the buck.

After decades of being a safe investment, the money market funds fell into difficulty in the 2008 crisis. After Lehman's failure, one money market fund (Reserve Primary Fund) broke the buck paying 99 cents on the dollar after a delay, triggering a run on other money market funds. Prior to this only one fund had broken the buck – in 1994 paying 96 cents in the dollar (Gibson (2012)).

Schapiro (2012) sets out the background to the problems in the Reserve Primary Fund which made losses the sponsor could not absorb. The USD 62 billion fund held USD 785 million of Lehman's debt and, when Lehman failed, experienced a run with USD 40 billion of withdrawals in two days. This run then spread to other money market funds which started to hoard cash. With money market funds accounting for 40% of investment in US commercial paper this led to the seizing up of that market creating huge spill-over effects. Money market funds had withdrawn USD 200 billion from the commercial paper market in two weeks.

Over 100 funds were supported by sponsors but the run continued and was only stopped when the government guaranteed the USD 1 share price on USD 3 trillion of money market funds and the Fed created facilities to support the short-term markets, (Schapiro (2012)). Increased regulation of funds was introduced in 2010 to reduce maturity of assets and increase asset quality. Further regulation is under consideration.

11.2.3. Finance Companies

A variety of different types of finance company grew up over the 1980s and 1990s. Poschmann (2012) provides an overview and highlights consumer finance firms, commercial finance companies, leasing companies and factors on the one hand, where these are standalone organisations, and on the other captive finance providers which are part of non-financial companies. Much of the captive finance has been auto or equipment lease financing related (Carey *et al.* (1996)).These finance companies provided loans to consumers and companies and funded themselves to a large degree from the wholesale money markets, rather than taking deposits from the public. The latter would have required a banking license in most countries. Poschmann (2012) shows US finance companies taking 60% of funding from short and medium term debt instruments. For captives, often the funding would be raised at a group level from the commercial paper market or bond market and down streamed to the captive lender, which took advantage of the better rating for the main company.

One question is what the relative comparative advantage is between banks and finance companies. Clearly the captives have access to an existing customer base (almost a vertical integration of services) but the other finance companies –

consumer credit, SME, leasing etc – compete with the banks. Carey *et al.* (1996) carried out a study using a large micro data set with information on individual loans to assess the differences in lending. They find that at that time finance companies in the US specialised in higher risk borrowers compared with banks – this encompassed firms with higher leverage and more risky cash flow. They also saw more focus from finance company lending on restructuring purposes such as acquisitions, leveraged buyouts and debt consolidation. They find that finance companies were more unlikely to lend without collateral than banks. Carey *et al.* postulate that reluctance by banks to extend credit to lower risk borrowers may be to limit reputational damage from recoveries processes. In the UK, lending to higher risk consumers is also dominated by non-bank finance. In part this is because of different monitoring regimes in place to try to ensure repayment – for example, for pay-day lenders, agents drawn from the same community. These firms also charge much higher interest rates which the banks might see as reputationally damaging.

Another element is that finance companies built up particular specialisms, probably to enable better management of risks, but also to create more focus in developing a market share. Some exploited perceived gaps in the types of funding provided for SMEs for example. Mishkin and Eakins (2008) argue that finance companies had greater freedom to offer specialised services because they were outside the regulatory net. Certainly they did not have to meet capital requirements set by the banking regulators.

In Europe a significant part of SME finance is provided by leasing or factoring companies rather than by banks. In factoring the bank lends against the collateral (at a discounted value) of the invoices the firm has outstanding and in leasing the bank has the asset as security. This focus on security contrasts with the Carey *et al.* (1996) finding for the US that finance companies were less likely to require security than banks. Ayadi (2009) finds that in a number of European countries fast growing SMEs used leasing as an important finance mechanism. Kraemer-Eis and Lang (2012), in an EIB working paper, survey the use of leasing by SMEs. They see leasing as a way to overcome information asymmetries and also to help higher risk firms to gain access to funding. Clearly the taking of security is important in this. They cite a study (Oxford Economics (2011)) which shows that for relatively new companies leasing and factoring become sources of finance earlier in the life of the company than bank loans.

However, the funding pressures during the crisis sharply impacted all lenders not just banks. In fact non-bank lenders were more heavily impacted because they could not access insured deposits. This has led to some non-bank finance companies seeking banking licenses.

11.2.4. Repos

One aspect of the market which involves the banking system but also provides a way to by-pass it is repo. A reverse repurchase agreement between two parties, where securities are sold in exchange for cash with a commitment to reverse the transaction at a future date, creates a secured loan. An investor can lend funds fully secured by the securities to which it is given title until the transaction unwinds. This had long been a way for securities firms, which lie outside the deposit insurance mechanism in the US, to achieve funding. The liquid assets in the trading books could be used as collateral for the borrowing. Banks also use it to raise funds and are themselves an intrinsic part of the market.

Collateral received as part of a repo transaction can in turn be used in a new transaction – re-hypothecation. Research published by the BIS shows a doubling in the size of the repo market from 2002 to reach USD 20 trillion across the US and Europe by 2007 (Hordahl and King (2008)).

The FSB (2012c) sets out an analysis of the market and lists typical repo investors amongst others as:

- Money market mutual funds;
- Commercial banks;
- Pension funds, investment funds and insurance companies;
- Official reserves managers.

Stock lending is another facet of the market where the driver is not the need for funding but the need to access particular securities to settle trades or alternatively the need for collateral. Securities are borrowed from long-term holders (insurance companies, pension funds, investment funds) against cash collateral. The FSB (2012c) cites a market source as estimating that USD 1.8 trillion of stock was on loan as of April 2012. Institutional investors are attracted to the market because they can increase returns by lending out securities in exchange for fees.

One aspect of the market is the use of prime brokerage accounts. Hedge funds which short sell need to be able to borrow stock to settle trades, but not all hedge funds can borrow cash or securities direct from institutional investors. Providers of prime brokerage accounts (broker dealers and banks) provide funding and borrow securities for the hedge funds. The hedge funds use the proceeds gained from short selling of securities to collateralize the borrowing of the securities needed to settle the trade.

The FSB has identified shadow banking issues related to repo, in particular leverage enabled by repo financing and facilitation of maturity and liquidity transformation. With regard to leverage, repo in effect reduces the connection between credit worthiness / leverage and access to funding. The lender is protected by the securities transferred and the extra margin taken to cover loss of value in a

forced sale if the borrower defaulted. The effect is that securities firms/hedge funds can, by using their inventory for repo transactions, raise large volumes of funding. Although repo enables greater leverage it also mitigates the effect of a default because borrowers are collateralized. But there can clearly be ripple effects through the market during stresses. One reason for this, highlighted by Gorton and Metrick (2010), is the effect of increases in margin requirements in stress periods. As uncertainty increases either about credit quality of counterparties or the value of the assets being repoed counterparties will increase haircuts, reducing scope for funding. In terms of maturity transformation, very short-term repo contracts could be used to fund longer term and potentially illiquid positions.

11.2.5. Securitization

11.2.5.1. Impact of Basel I

The adoption of the Basel I global minimum capital standard helped to drive shadow banking in a different direction – use of vehicles sponsored by banks. The very broad risk categories in Basel I (which barely differentiated between the riskiness of different private sector exposures, except for residential mortgages) provided clear incentives for regulatory arbitrage. One aspect of this was that it encouraged the use of securitization to alter the risk profile of banks' portfolios relative to the capital being carried. A bank could move the better quality risk exposures off the book, increasing the riskiness of the remaining exposures relative to capital, while leaving its capital adequacy (under the Basel I calculation) apparently unchanged. This was most marked in the US. Basel I was adopted in 1988, and, after the first decade, the Basel Committee conducted a major study of the effects of the adoption of the minimum banking capital requirements (Jackson *et al.* (1999)). It concludes that capital arbitrage was being used to exploit the large divergence between the economic risks in bank portfolios and the Basel I measure of capital, with low risk portfolios relatively penalized and high risk treated too lightly. It identifies different forms of regulatory arbitrage:

– Cherry picking – simply focusing on origination of lower quality assets;
– Securitization with partial recourse – the sale of assets to a special purpose vehicle (SPV) which financed the purchase of the assets through the issue of asset backed securities (ABS);
– Remote origination – the SPV generating the assets rather than the bank originating.

The core aspect of the use of SPVs in securitization was that the vehicles were treated as legally separate from the sponsoring bank and therefore not consolidated into the bank's financial statements and regulatory reports. Banks could generally treat the sale of the assets to the vehicle as a true sale (removing the risk

from the bank's balance sheet). To increase the quality and credit rating of the ABS, the bank did provide credit enhancements (recourse) and these carried capital requirements but even so the bank could improve its risk asset ratio (the Basel measure of capital adequacy) through the process if the assets originated and moved into the vehicles were sufficiently high quality. Recourse took a variety of forms. One way in which the bank could still bear part of the risk was through the provision of standby letters of credit or the holding of subordinated interests in the SPV. To enable the ABS to achieve a high rating, the sponsoring bank would usually hold a first loss piece which would absorb losses up to a multiple of the expected loss on the loans in the pool supporting the structure, before the higher tranches (the ABS) were impacted. The recourse was covered by a 100% capital requirement (i.e. dollar for dollar) but even so the bank's capital ratio rose. To go through the example used in the Basel Committee paper (Jackson *et al.* (1999)), if a bank securitized USD 42 billion of non-mortgage assets and the SPV issued USD 40 billion of ABS, and the bank retained USD 2 billion of risk in the form of a loan to the SPV, the bank's capital required would change as follows:

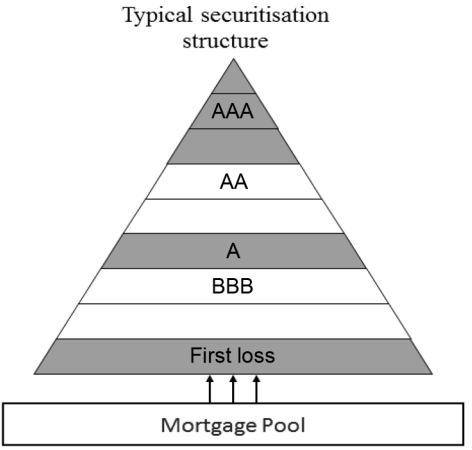
– Pre securitization, regardless of the quality of the assets, the Basel I capital requirement was 8% of the amount i.e. GBP 3.36 billion;
– Post securitization of the USD 42 billion of assets, if USD 2 billion in credit enhancement was retained the requirement was only USD 2 billion.

The bank was always better off as long as the loans were of such quality that the recourse needed to cover the core risk in the vehicle (and therefore boost the rating of the ABS) was lower than the risk assumed under Basel I, which was 8% of the amount outstanding. It was a clear arbitrage of the overweighting of the better quality risks in the Basel framework. The bank had an incentive to securitize its best quality loans because, for these, the enhancement needed would be far less than the Basel 8%. However, the increase in average risk in its own portfolio would not change the Basel requirement on the remaining portfolio. This meant that the bank would appear to be better capitalized.

For high quality residential mortgage assets, the gap between the perceived risk (and therefore the enhancement required) and the Basel requirement (4% because the assets were 50% weighted when calculating the 8% risk asset ratio) could be very large. Figure 11.1 illustrates a typical securitisation structure.

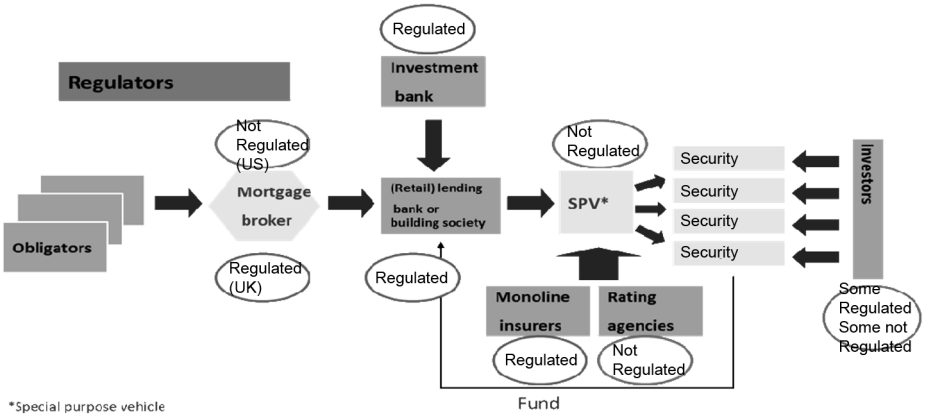
Even more pernicious from a financial stability viewpoint was the encouragement that Basel I gave to banks not to originate the loans that went into the vehicles, particularly if these were lower quality. This was perverse because it meant that these lower quality loans did not go through the banks' lending standards and other checks. If the SPV itself originated the loans, the credit enhancement provided by the bank was treated as an exposure to the SPV and carried an 8% requirement against the enhancement rather than the 100% if it had itself origi-

Figure 11.1: Typical Securitisation Structure



nated the loans. This paved the way for the origination of mortgages by mortgage brokers to feed the US residential mortgage backed securities (RMBS) growth in the run up to the crisis. In Europe, in contrast, loans for the most part continued to be originated by the banks themselves before being placed in the vehicles. Figure 11.2 shows the end-to-end originate to distribute model prior to the crisis and the extent to which different parties were unregulated.

Figure 11.2: Originate to distribute model for mortgages



A further aspect of Basel I provided yet more scope for regulatory arbitrage using securitization. In 1997, the market risk amendment (Basel Committee on Banking Supervision (1996)) for trading books had introduced requirements which could be much lower than the banking book requirements because they recognized the short periods that were needed to sell or hedge trading book assets. The assump-

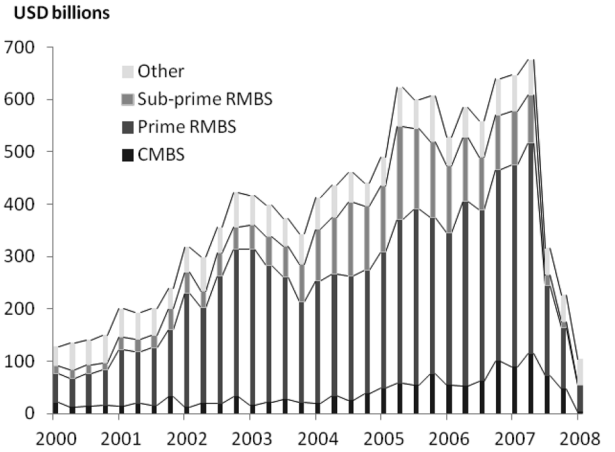
tion was that in normal times this would be possible overnight and in more difficult times within 10 days. In contrast the banking book requirements were based on a one year assumed holding period. The credit enhancements for securitizations could be held in the trading books which reduced the capital requirement still further relative to the banking book treatment. There was no liquidity test to ensure that only liquid assets could be treated within the trading book requirements. This too paved the way for many of the problems seen in the crisis with large holdings of illiquid securitization exposures, as well as correlated exposures such as loans being warehoused waiting to be placed in vehicles, being held in the trading books with low requirements.

The Basel Committee study (Jackson *et al.* (1999)) on the effects of Basel I looked at data on the volume of securitization in the US and by March 1998 outstanding non-mortgage ABS amounted to over USD 200 billion; more than 25% of the loan books of the 10 largest US bank holding companies.

11.2.5.2. Growth of Securitization

The abundant credit in the run up to the crisis combined with official encouragement of mortgage lending to weaker borrowers (see SIFMA (2008)) fuelled the expansion of securitization and also a radical change in the structure of the market. Not only did the proportion of securitization underpinned by sub-prime mortgages increase dramatically in 2006 and 2007 but lending also suffered deteriorating standards and due diligence. Figure 11.3 shows the expansion in the market in the run up to the crisis and also the increasing proportion of loans underpinned by sub-prime RMBS.

Figure 11.3: Quarterly Global issuance of ABS



Source: Bank of England/Dealogic

By 2007 annual new issuance of mortgage-related securities in the US was USD 2.04 trillion of which agency pass-throughs totaled USD 1.15 trillion. Non-agency RMBS, where loans did not meet agency standards, were USD 441 billion (SIFMA (2008)). Sub-prime mortgage originations had almost tripled between 2000 and 2006 to 20% of total mortgage originations (Dell'Arricia *et al.* (2008)). Mortgages being placed in the vehicles were to a substantial degree being originated by mortgage brokers not by banks, which were sponsoring the vehicles, and there was deterioration in lending standards applied. Dell'Ariccia *et al.* (2008) show that over the run up to the crisis there was a substantial decrease in denial rates on sub-prime loans and an increase in loan to income ratios. Fitch (Pendley *et al.* (2007)) reviewed a small sample of the 2006 loans underpinning securities which defaulted and found many instances of poor lending decisions and misrepresentation by borrowers. They claim there is evidence of fraud or misrepresentation in almost every file.

The increase in the proportion of sub prime loans in the pools was clear to investors and to enable the securities at the top of the waterfall to continue to be AAA rated, structures became ever more complex, with more and more tranches below the AAA tranche to absorb losses. With more complexity came greater opacity not helped by prospectuses growing to 500 or even in some cases 1,000 pages long.

The basic structures also proliferated. Whereas the original structures were SPVs with pools of loans financed by the issue of securities, other types of vehicle developed which were again more opaque. Structures with collateralised debt obligations (CDO structures) used securities issued by other securitization structures in the pool (rather than loans) with the vehicle financed by the issue of new securities. Figure 11.4 shows the relationship between RMBs, CDOs and CDO squared structures – with the lower tranches of RMBs forming the pools for CDOs and the lower tranches of CDOs forming the pools for CDO squared. Each vehicle had its own tranching structure to absorb risk below the AAA layer. The payout structures also varied, even in some cases creating non ordinal structures where some lower rated tranches would be paid out before some AAA tranches in an early amortization. Increasingly insurance from monolines was used to enhance the rating of the top layer of securities.

Structured investment vehicles (SIVs) were set up, also holding CDOs, but funded by three month commercial paper. These too transmogrified over time to become more risky with the bank liquidity lines, which had been in place to provide funding if the US commercial paper market dried up, being removed to boost yield in some structures. When the three month commercial paper market did indeed dry up during the crisis, this left the sponsoring banks with the unfortunate option of either providing very large amounts of liquidity or suffering the potential reputation damage of letting the structure fail. Figure 11.5 sets out the SIV structure.

Figure 11.4: RMBs, CDOs and CDO squared

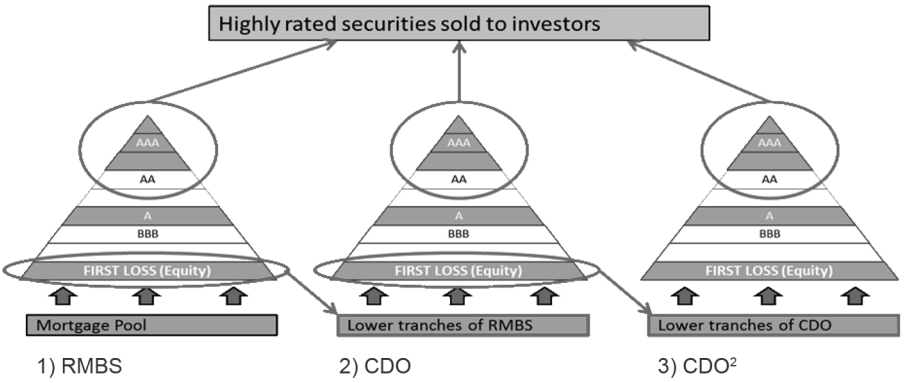
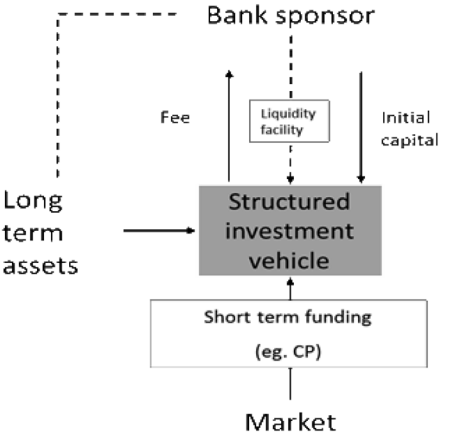


Figure 11.5: Structured investment vehicle



As the demand grew for CDOs, the point was reached where there were not enough securities from securitization structures to generate the volume needed for the different structures. Synthetic CDOs were created to meet the demand with credit default swaps being used to create similar cash flows to the mortgage backed securities which otherwise would have underpinned the CDO structure.

One of the factors behind the demand for the securities from securitization structures was the shortage of AAA securities in the 2000s. With shrinking public sector debt there had been a downward distortion of yields on government bonds given that a variety of financial institutions and investors needed highly rated paper. This had led to a search for highly rated securities offering a higher yield. This was satisfied by the ever growing volume of securities from securitization structures.

Banks and securities firms were completely intertwined in the market and developed large concentrations in exposures to the US mortgage market through a variety of channels. Banks and securities firms sponsored the securitization vehicles and set up the SIVs, they provided the enhancements which enabled the AAA rating on the top tranches and held large quantities of securities issued by third party securitization vehicles as investments. Held in the trading books these securities did not attract much in the way of capital requirements (largely flowing into the VaR calculations as if they were standard corporate bonds with the particular rating). The bank investments were driven by the same incentives as for other investors – a need for high quality paper and higher yield. Treasury operations of banks, for example, had large blocks of mortgage backed securities in the liquidity pools to meet earnings targets. Banks were also warehousing loans to go into future securitizations in conduits adding to the concentrations. It was this nexus of exposures which fuelled the solvency problems at the heart of the crisis once the value of the securities started to be marked down. This in turn triggered liquidity pressures as solvency came into question.

Pozsar (2008) argues that "the accumulation of massive amounts of senior and super-senior CDO tranches in SIVs and the buildup of enormous securitization pipelines through conduits formed a network of highly levered off-balance-sheet vehicles that constituted a shadow banking system". He is here focused on the leverage that was created by the structures (SIVs 15 times levered and conduits 100% debt financed) and the maturity transformation – with SIVs and conduits financing longer term exposures with short term funding.

In fact the shadow banking implications went far beyond this. In effect what had happened in the US (and to a limited degree in Europe) was the outsourcing of mortgage loan generation to shadow banks. In the US it was to a large extent mortgage brokers which originated the loans and dealt with the borrowers. An enormous market had developed underpinned by loans that had not gone through bank lending standards and processes. The weak and eroding standards applied meant that the whole edifice of RMBS, CDOs, CDO squared, SIVs and so on was built on shaky foundations. In this it had parallels with early non-bank bank crises which had their genesis in poor lending standards or poor risk management in the non banks. The leverage that was built on these foundations just exacerbated the fall when it occurred.

Protections had been built into the market. Gorton and Metrick (2010) point to the protections against adverse selection where a bank originates the loans and places a portion of the loans originated in the SPV, in particular detailed eligibility criteria and the retaining of the equity or first loss positions – so that the bank would suffer if the loans experienced large losses. The problem with the RMBS market in the US was not as much an adverse selection as a principal agent issue.

For the most part in the US the loans were not being originated by the banks but by mortgage brokers. Protections had been built into the system to deal with the risks this created, in particular sampling of borrower documentation by sponsoring banks, but the failures in documentation highlighted by Pendley *et al.* (2007), show this was not effective. There is anecdotal evidence of a reduction in sampling as volumes grew and pressures to cut costs increased. Loans were going into the pools with no verification and documentation of borrower income and employment. Standard & Poor's (2009) has found for the 2006/7 vintages 'loans with little or no verification of income, assets or employment were among the worst performing'.

11.3. DEVELOPMENTS SINCE THE 2007-2008 CRISIS

11.3.1. Switch from Securitization to Covered Bonds

The securitization market on both sides of the Atlantic has been tarnished by the crisis. Investors experienced a mix of adverse consequences from higher default rates to extreme illiquidity of the bonds held leading to substantial marking down of positions. Paradoxically the US securitization market has remained largely open while the European market which was much smaller has been more affected. This was despite much lower default rates on European securitizations than US. Blommestein *et al.* (2011) quote Standard and Poor's default rates for all European structured finance issues of 0.95% between mid-2007 and end 2010 compared with 7.7% for all US structured finance issues.

European securitization activity has been severely constrained post crisis. Blommestein *et al.* (2011) show placed issuance as increasing from EUR 25 billion in 2009 to EUR 88 billion in 2010 but this is still way down on the EUR 460 billion in 2006. In 2012 placed securitization fell to EUR 72 billion, (AFME (2012)). In addition, Blommestein *et al.* show that most European securitization has been used to raise funds from the ECB rather than being sold to the wider market. They also highlight that the US RMBS market has benefited from the continuing activity of the federal mortgage agencies which are currently funding more than 90% of US mortgages; non agency issuance was only USD 129 billion in 2010 down from over USD 2 trillion in 2006.

To fill some of the funding gap from securitization, European banks have increased issuance of covered bonds and this is increasing in the US as well. Covered bonds are relatively new in the US but are an established instrument in Europe, encouraged by favorable legislation in many countries which confers bankruptcy protection. Unlike securitizations, in a bankruptcy the bond holders have recourse to both the bank and the covered bond pool. Table 11.1 compares

covered bonds and securitizations. Covered bonds are also much more transparent and have been more palatable to the market given concerns about securitization structures. There are two ways of structuring covered bonds. In one approach the bank originates the loans and ring fences the loans on its balance sheet to back the securities it issues. In a bankruptcy the bond holders would have first claim on the proceeds from sale of the ring fenced loans as well as having a claim on the rest of the assets of the bank. Alternatively the bank can set up an SPV which holds the loans and issues the bonds. But the economics of the transaction is very similar. The bond holders in this structure also have recourse to the issuing bank as well as first claim on the pool. There is a covered bond trustee which supervises the management of the covered bond pool. Covered bonds are more like secured funding than shadow banking. Banks originate the assets and the bond holders have recourse to the bank and the pool. The assets are high quality and bonds are not tranched. They are therefore more transparent than the securitization structures where tranching was used to enhance the quality of the upper tranches, given sometimes low quality loans in the pools. The US authorities are currently encouraging the development of the US covered bond market to supplement the securitization market. The FDIC has clarified the position in a bank failure, setting out the circumstances where expedited access to pledged collateral can be obtained removing one of the main uncertainties for the US market (FDIC (2008)). One issue with covered bonds is that by ring fencing assets they increase encumbrance, reducing the free assets which can support a payout to creditors in a bankruptcy. Another disadvantage compared with securitization paper is that they are a claim on the bank and therefore go into a single name limit reducing the amount that any one counterparty can hold.

Table 11.1: Comparison of covered bonds and securitizations

	Covered bonds	Securitizations
Accounting	On balance sheet	Off balance sheet
Recourse	Direct or indirect recourse to the issuer	Limited recourse
On bankruptcy	Loans in pool used to repay bond holders	Complicated waterfall/early amortization in SPV
Tranching	None	Tranching used to create high rated bonds

The future growth of securitization is uncertain. Simpler, more transparent and guaranteed higher quality structures would be needed to encourage institutional investors back into the market. It is possible the authorities could provide incentives for the market to go further in this direction through use of regulatory levers (see Jackson 2011). One recommendation in the paper was to use access to the

banks' liquid assets buffers to encourage greater simplicity and quality. The Basel Committee has now announced that securitizations may be included in the liquidity pools but has not set any requirements regarding greater simplicity, (BCBS (2013)).

11.3.2. Growth of New Shadow Lending

The pressures on the banks and the general de-leveraging by the banking industry is leading to the development of non-banking activities that are much more like traditional bank lending than was the case with the explosion of various types of structured product in the run-up to the crisis. In a very low interest environment non-banks are searching for yield and a move into banking style assets provides scope. Shadow banking mechanisms are growing up or expanding to provide finance to SMEs, mid-market corporates and projects. The following sections examine these developments. For SME and mid-market corporate lending to be successful mechanisms need to deal with the information asymmetry between the lenders and borrower. Banks lend using a mix of hard and soft information on borrowers. Berger and Udell (2004) set out how soft information is gained through contact over time with the SME with an important role for loan officers. The new shadow banking mechanisms, to be successful, must have mechanisms to assess risks sufficiently well to ensure margin covers the likely defaults going forward. The success of these mechanisms will be an important part of the sustainability and growth of the shadow banking sector.

11.3.3. Factors Driving Growth

11.3.3.1. Regulatory Change

Bank regulation played an important role in the development of shadow banking up to the crisis, although it was by no means the only factor. Search for highly rated securities offering significantly higher yields than government bonds as well as the demand for lower cost methods of funding loans were also important factors in the development of securitization. A very large part of the response to the crisis has been further tightening of bank regulation and this will in turn drive more business into shadow banking sectors.

Following the financial crisis it was recognized by regulators and the industry that bank equity levels were too low and needed to be adjusted. The Basel Committee has made a series of changes to bank capital requirements. Minimum common equity levels are to be increased from 2% to 4.5% and over and above this level banks have to hold a capital conservation buffer of 2.5% which can be utilized but only with penalties, (BCBS (2010)). In addition, globally systemically impor-

tant banks will have to hold a further buffer of between 1% and 2.5%. These requirements will be supplemented by a non-risk based leverage ratio. Banks are targeting core Tier 1 ratios of between 10% and 13% or so to give a buffer over the minimum requirements. The requirements are being phased in – see Figure 11.6 – but official action and market pressure have led banks to move much more quickly than required.

A new liquid assets buffer (the LCR) is adding to bank costs because of the low yielding assets in which it has to be invested – although the size of the buffer has been reduced by changes made to the requirements by the Basel Committee, (BCBS (2013)).

Figure 11.6: Basel capital buffers, leverage and liquidity requirements[4]
Phase-in arrangements (shading indicates transition periods).

	2011	2012	2013	2014	2015	2016	2017	2018	2019
Leverage ratio	Supervisory monitoring		Data gathering from 2014, introduction 2018 Disclosure starts 1 January 2015					Migration to Pillar 1	
Minimum common equity capital ratio			3.5%	4.0%	4.5%	4.5%	4.5%	4.5%	4.5%
Capital conservation buffer						0.625%	1.25%	1.875%	2.5%
Minimum common equity plus capital conservation buffer			3.5%	4.0%	4.5%	5.125%	5.75%	6.375%	7.0%
Liquidity coverage ratio	Observation period begins				60% Introduce minimum standard	70%	80%	100%	
Net stable funding ratio		Observation period begins						Introduce minimum standard	

11.3.3.2. Regulatory Uncertainty

Banks are finding new capital raising to meet the requirements extremely difficult. One part of this is probably the unusual amount of 'noise' and uncertainty regarding the future path of bank regulation. Different authorities are expressing a range of views about the possible end point for bank capital (some proposing as much as 20%), bank structure with ring fencing (Volcker, Vickers and Liikanen) as well as possible structural changes under recovery and resolution planning. The Basel Committee too is continuing to look at different aspects of the capital requirements – for example the trading book requirements and operational risk as well as RWAs under Basel III. This all means there has not been a clean step change to a new regulatory regime.

[4] The Phase-in arrangements are those in the European implementation through CRD IV, (European Commission (2013)).

This regulatory uncertainty is at a time when the banking sectors have not yet recovered from the crisis and indeed pressures on Eurozone banks have intensified. It cuts across the received wisdom in terms of public policy which is that increasing the ratio of signal to noise is a critical factor in success – for example in monetary policy (Amato *et al.* (2003))

The Association of British Insurers in evidence to the Parliamentary Commission on Banking Standards (2012) stated that "regulatory uncertainty and inconsistency are a significant investor concern. Lack of clarity regarding capital levels, and the apparent conflict between resilience and recovery, are muddying the investment case for UK banks". This view is also supported by surveys of investors carried out by the Institute of International Finance (2012b). 75% of investors surveyed believed that regulatory uncertainty was contributing to the current low price to book ratios.

Banking business models have to be changed to reflect the impact of the new regulatory regime on profitability of different business lines and the regulatory uncertainty is making those decisions difficult. It also makes it difficult for the institutional investors to assess future profitability. Institutional investors react to uncertainty by discounting future projected earnings much more heavily which will drive price to book ratios lower.

The literature on the effects of increases in equity requirements for banks which focuses on Modigliani Miller (1958), see Admati *et al.* (2011) does not consider the effect of uncertainty when the end point is unclear nor the adjustment time and costs.

11.3.3.3. Bank De-leveraging

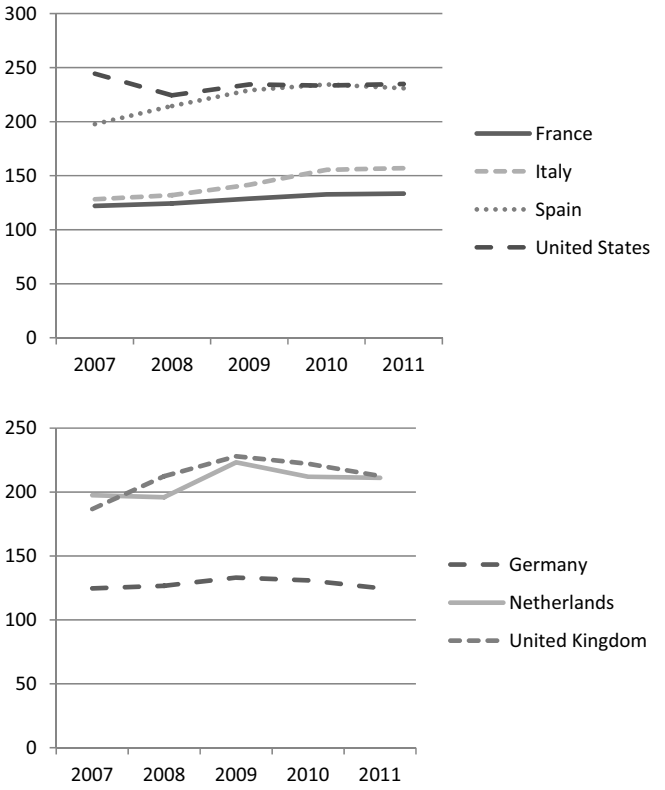
The net effect of the adjustment that the banking system is going through and the difficulties in raising capital is deleveraging which is providing opportunities for shadow banks.

The global banking system had to deleverage following the crisis and the need to build higher capital buffers quickly has intensified the effect. One aspect of this is a retreat by banks back to their core home country activity. The 82nd BIS Annual Report (2012) shows the degree of international portfolio cutting by Belgian, Dutch, French, German and Italian banks. This has amounted to more than USD 6 trillion (43% of their international portfolios) between early 2008 and end 2011. This has however been partly offset by some expansion by some country groupings.

The IMF (2012) carried out an exercise to assess the potential scale of asset reduction at EU banks and the impact on lending to the private sector to achieve particular structural targets, in particular a core tier 1 target of 9% introduced by the

EBA. They found that in Q4 2011 alone total assets of the largest EU banks fell by USD 580 billion. A greater issue was the estimated further cut in assets by a sample of 58 large European banks of USD 2.2 trillion to USD 3.8 trillion by end 2013. In an update in October 2012, they saw a divergence between the cutbacks the banks were making in their exposures at the periphery and bank credit at the core which was continuing to rise. However, World Bank figures for domestic credit (provided by the banking sector) as a percentage of GDP show a relatively flat or declining picture in many countries – see Figure 11.7.

Figure 11.7: Domestic credit provided by banking sector (% of GDP)



One question has been the extent to which this is due to low demand rather than low supply. There is some evidence that restricted supply is playing a part. The Bank of England's Agents' Summary of Business Conditions (August, 2012) states that "some businesses were refraining from applying for loans due to a perception that they would be unavailable". The ECB started a survey in the aftermath of the crisis to assess access to funding for SMEs in the Euro area. The first survey in 2009 (ECB (2010)) found that although the majority of loan applications were successful, access to finance had deteriorated post crisis. 43% of those SMEs that

had made bank loan applications in the first half of 2009 had seen reduced availability of funds, a larger proportion than was the case for large firms, and micro businesses and younger businesses were particularly hit. What were seen as high charges deterred some micro firms. This has opened up a gap in the market which new lending channels are expanding to fill.

New approaches to investment in credit exposures are also being driven by banks' need to focus on originate to distribute using mechanisms other than securitization. Anecdotal market comment indicates that in response to the need to deleverage, banks are reducing the extent to which business units can use the balance sheet to support lending, which is pushing the market towards a new type of originate to distribute lending. Loans are made or finance is provided and then packaged to go to other banks or end investors. Some banks are using insurance to enhance the credit quality of the exposures before they are sold on into the market. This is rather like traditional loan syndication by going into the hands of a wider variety of investors.

Overall a variety of channels are growing up to enable end investor funds to be invested in loans or other credit exposures without using securitization vehicles. This includes structures for institutional investors and private investors.

11.3.4. New Mechanisms

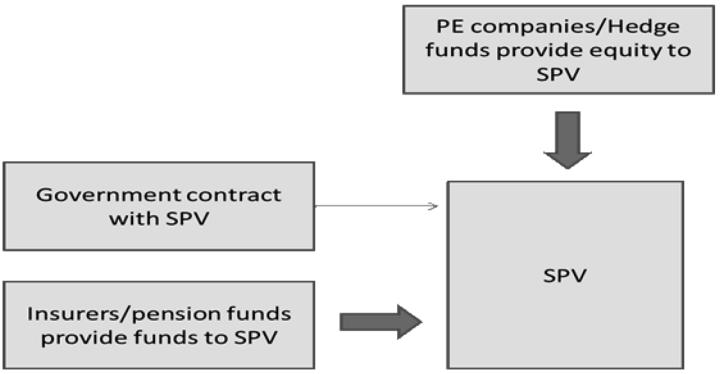
11.3.4.1. Institutional Investors

Institutional investors (insurance companies and pension funds) are moving into a variety of lending-style activities such as such as commercial mortgages, project finance and infrastructure as well as direct lending. Life insurance companies, for example, which have many long-dated liabilities and need matching assets, are affected (as are pension funds) on both the liability and asset sides of the balance sheet by the current low interest rate environment and are searching for sources of higher yielding assets. The downward pressure on yields on their traditional assets has been exacerbated by the high demand for liquid assets, particularly government bonds, by the banks which are building up their liquid assets buffers. At the same time, the banks' retreat from capital intensive lending areas, such as project finance, given the new regulatory environment, has opened up opportunities. Because life insurers have many relatively stable long dated liabilities they are willing to match them with illiquid assets. In the UK this has resulted in some so-called liquidity swaps where insurers have swapped lower yielding government bonds for illiquid bank assets as well as finding other routes to invest in lending type assets. The focus of insurers tends to be on credit exposures which have some kind of security. In the UK they are also trying to focus on assets which have a perceived lower estimated credit risk such as infrastructure with a govern-

ment sponsor or social housing, although elsewhere some insurance companies are also going into lending more broadly, for example SME loans. By investing in direct credit exposures insurance companies can increase yields to 200-300 basis points over LIBOR.

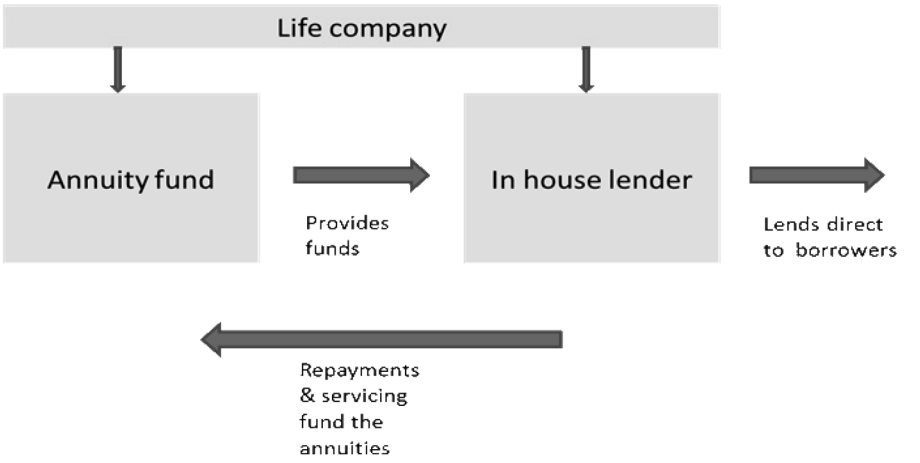
There are a variety of mechanisms for placing funds into lending products. In the UK, insurers and pension funds are filling the gap from the retreat of banks from private finance initiative (PFI) type public sector projects. Institutional investors are directly replacing the loans which were being provided by banks to the SPV. The structure of the investment is set out in Figure 11.8.

Figure 11.8: Infrastructure lending



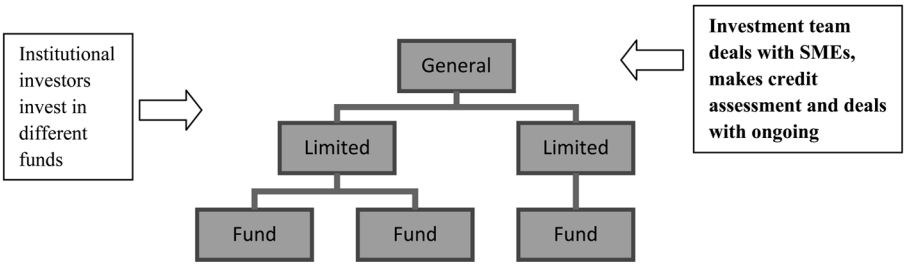
Insurers and pension funds provide the loans and PE companies or hedge funds provide the equity – in a ratio of equity to loans of 10/90. The same structure is used to finance privately owned infrastructure projects where a private company has the contract with the SPV – for example renewable energy. There are also other mechanisms (see Figure 11.9) for secured lending, for example student accommodation. The institutional investor could provide a loan direct to a university secured by the student accommodation. The advantage here is that the University is in effect acting as an intermediary aggregating a large pool of residential assets. Further mechanisms are used to invest in commercial mortgages. Some insurers have in-house lenders which provide the loans, giving the following structure:

Figure 11.9: Life companies with in house lenders



Investment fund vehicles are being used to channel institutional funds into a wider variety of lending (see Figure 11.10), including SME lending. One issue for non-bank lenders is that banks lending to SMEs can benefit from a wide variety of fees covering services such as factoring and invoicing. This substantially increases the return. Non-bank lenders do not usually offer the same range of services. But on the other hand banks may be slower to approve lending – with probably a minimum three week turnaround.

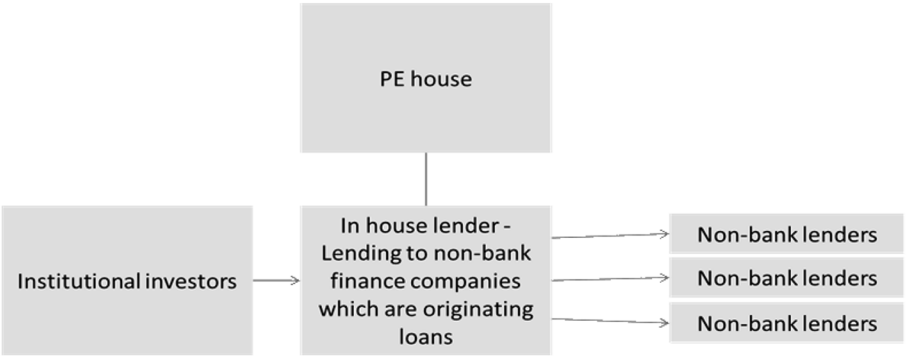
Figure 11.10: Investment fund vehicles



The exposures in the funds could be standard loans or profit streams from projects. Where banks are providing the loans from their existing portfolios (as part of deleveraging and exiting areas of activity which demand very high bank charges) credit insurance is sometimes used to enhance the quality of the assets. In some structures the PE house has its own in house non bank finance company which generates the loans. The loans are then placed in funds in which the institutional investors invest.

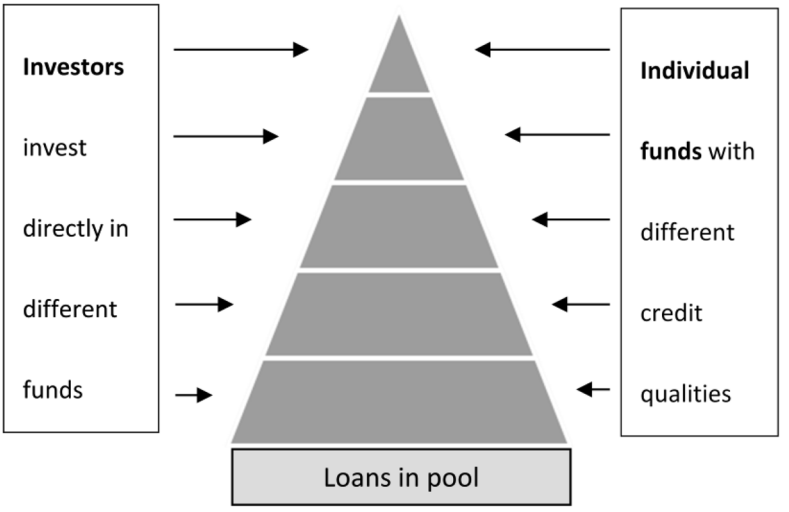
A further variant (see Figure 11.11) is where the PE house owns a fund which finances different non-bank lenders. The institutional investor is investing in the vehicle which acts as intermediary.

Figure 11.11: PE house lending to non-banks



Another structure which is being used is uni-tranching (see Figure 11.12). The fund manager takes a pool of loans into the fund as the assets and then tranches the credit risk and allocates it to different funds being managed. Investors invest in a fund with a particular credit risk profile, rather than investing in different securities as would be the case in a securitization structure.

Figure 11.12: Uni-tranched structure



A further structure is where the institutional investor buys loans direct from the bank but the bank acts as an agent continuing to service and manage the loans.

One factor behind the growth in these channels appears to be the relative magnitude of capital required if banks versus insurance companies hold the loans. Pension funds have limited or minimal capital requirements. Table 11.2 compares the indicative requirements which have been estimated for an insurance company using models under Solvency II against a bank using advanced IRB models under Basel II. For secured loans of different types the capital requirements are substantially lower for the insurance company than for the bank.

Table 11.2: Indicative Requirements – Solvency II vs Advanced IRB Models under Basel II

Asset	Solvency II (internal model)	Banks (advanced IRB)
Commercial property mortgage	6.0%	9.5%
Social housing	0-1.4%	1.1%
Corporate loans 1 year, 90% secured, unrated	3.5%	6.1%
Corporate loans 10 years, 90% secured, unrated	3.5%	6.1%

This clearly gives an arbitrage opportunity. Solvency II is not yet in place (and may not be adopted before 2016 or later) but the Solvency II models are close to the internal models currently being used to drive insurance company capital in the UK and therefore in the UK the comparison will remain valid. Elsewhere in major European countries (France, Spain, Germany, and Italy for example) there is no risk-based capital reserve – no distinction is drawn between investing in cash or corporate loans – and the arbitrage opportunities are therefore greater.

11.3.4.2. Credit Platforms

a) Receivables Exchanges

Another area of development is the growing use of credit platforms of various kinds to channel investor funds in lending. One channel is the use of exchanges which are managing the bidding by different investors for blocks of receivables.

The Receivables Exchange is an example. It is a US based market place for receivables with the auction being held on line. Businesses can post receivables for sale and can set a minimum price for the auction. Accredited institutional investors bid in real time for the receivables. NYSE Euronext took a stake in the exchange in 2011. The Receivables Exchange registers buyers and sellers, verifies identities and coordinates payments between the two parties. The same approach was introduced in the UK with MarketInvoice which started in 2010.

These exchanges help to ease funding pressures on firms as well as allowing funds to be raised on invoices not allowable by factors (the traditional approach). There is also a European Trade Receivables Exchange, EuroTRX.

b) Peer to Peer Lending

Following the crisis, one aspect of the shadow banking market has been a proliferation of peer-to-peer lending facilitators/platforms. These firms, set up by individuals in their 20s and 30s (rather like the dot coms), have established a new mechanism to facilitate retail lending to small corporates and even other individuals. Peer-to-peer lending is the practice of direct unsecured lending to small businesses or individuals by other individuals and potentially other businesses but in terms of quantity is predominantly lending to individuals. The peer-to-peer firm is only an intermediary and does not underwrite the risk. But they provide other services such as marketing to attract lenders and borrowers and information gathering and monitoring.

Individuals wishing to lend money specify the types of borrower to which they wish to lend to via an online platform provided by the peer-to-peer firm, which also validates and provides information on those wishing to borrow. In order to diversify risks, lenders' funds are split into many small loan parts that are spread amongst different individual borrowers matching the criteria. For example, an account holder may agree to lend at a certain rate to all high street butchers in the north East of England which have an A rating provided by the peer-to-peer firm. The instruction from the lender results in the lender's funds being divided into many small loan parts (e.g. GBP 10) which are distributed among the matching (and willing) counterparties. For each loan part, the loan agreement is directly between the lender and the borrower not with the intermediary – the peer-to-peer firm. The peer-to-peer firm has obligations and responsibilities in terms of provision of accurate information for the original loan decision and continues to monitor the borrowers and updates the ratings. In terms of lending to SMEs, there are in some cases covenants, which, if breached, force the lender to repay.

For some peer-to-peer lenders the process can be in the form of an auction in which lenders bid to lend to particular counterparties at a certain rate and the borrowers select the best rate that they can get. Lenders may also be able to resell their "loan parts" in a secondary market provided by the same peer-to-peer intermediary. The investor's funds prior to investment are in a ring fenced account and cannot be used by the intermediary. Peer-to-peer lending firms offer the platform and the information. The peer-to-peer firm transfers the funds to the borrower and collects repayments from borrowers redistributing them to lenders accounts. They publish lending and credit performance information and appoint collections agencies to deal with bad debts.

The rating provided by the peer-to-peer lender is based upon on-line sources such as (in the UK) Experian, Equifax, and Callcredit as well as analysis by the peer-to-peer intermediary. Initial sole reliance on publicly available credit data has now been supplemented with direct discussions with borrowers prior to loans being made. The structure of the peer-to-peer firms, and the way of operating, differs across the market. Some peer-to-peer firms (e.g. RateSetter) have set up provisions to provide a buffer against losses, accumulated from part of the commission paid to the peer-to-peer firm by borrowers. Most others leave the full risk with the lender on the principal that the individual loans are very small.

Due to the lower overheads of peer-to-peer firms relative to banks, lending rates and yields may be more attractive than a bank could offer to savers and borrowers. However, it is a very different model compared with a bank. A bank may have more access to private information gained from the borrower although the gap is much less now in the UK because peer-to-peer lenders can access current account information. A bank also takes collateral to reduce the losses if borrowers default – the Economic and Social research Council study of small firm credit showed that 40% of term loans are collateralised, (Fraser (2009)), and this has probably increased substantially since. Even here the gap is narrowing because peer-to-peer lenders can also take security. However, the banks also take floating charges which put them ahead of other creditors including peer group lenders in a bankruptcy.

The peer-to-peer market was at a very early stage prior to the crisis (with one facilitator established in the UK) but have proliferated since in the UK – see tables 11.3 and 11.4 below. There are two reasons for this. The first is that in a low interest environment, investment vehicles which can offer retail customers returns (net of charges) of 5% up to 11% are attractive. Any restrictions on SME lending because of bank capital pressures and de-leveraging will also have encouraged the set-up of these firms.

The tables below set out the different providers in the UK and US and approximate figures for lending to date sourced from their websites.

Table 11.3: Statistics for the UK peer-to-peer lending firms

Name	Launch date	Lent to Jan 2013	Profile of borrowers
Zopa	2005	GBP 261m	Retail/Consumers
RateSetter	2010	GBP 49m	Retail/Consumers
Funding Circle	2010	GBP 71m	SME
MarketInvoice	2011	GBP 39m	SME (invoice finance only)
Seedrs	2012	GBP 477k	Entrepreneurs/ seed capital
Squirrl	2012	GBP 386k	SME
ThinCats	2011	GBP 15m	SME
Crowdcube	2011	GBP 5m	SME
Funding Knight	2011	No information found	SME

Sources from the UK peer-to-peer lending firms websites. 'P2P money' website

Table 11.4: Statistics for the US peer-to-peer lending firms

Name	Launch date	Lent to Jan 2013	Profile of borrowers
Lending Club	2007	USD 1,235m	Retail/Consumer
Prosper –	2006	USD 446m	Retail/Consumer

Sources from the US peer-to-peer lending firms websites.

Peer-to-peer lending still has a microscopic part of the overall SME market and what is almost certainly holding it back is funding availability. While it is still dependent on retail funding, growth will probably remain limited. Only by providing mechanisms which attract institutional investors as lenders will real growth be created. Institutional investors require much enhanced information on performance, but this will be solvable over time as more data is available. The companies are potentially very data rich and are not constrained by the legacy systems of the banks making the development of state of the art information systems possible. Substantial lending by institutional investors could provide a tipping point. This in turn could come from the use of intermediary vehicles investing in peer-to-peer.

Looking forward, their success and final importance in overall lending and competition with the banks will also depend on how they perform and their overall credibility. Credit evaluation procedures could well be less effective than is the case for banks. A sudden sharp increase in defaults could severely damage the reputation of the market. They can offer high returns to investors but it depends if these are seen as providing sufficient reward for the risk. Default rates have been very low in the UK to date, but this has not been the case in the US. In 2008, although peer-to-peer lenders were unregulated the Securities and Exchange

Commission (SEC) issued a 'cease and desist' order regarding Prosper, one of the two big peer-to-peer lenders, in response to very high 20% plus default rates (SEC (2008)). The SEC subsequently required peer-to-peer companies to register their 'notes' or loan parts as securities which has been a substantial burden and deterred growth. Growth in the US was also held back by the minimum 3 year maturity on loans making investments illiquid for investors. The setting up of a secondary market eased these issues. Lending Club has now received funds from sovereign wealth funds and even banks and with total lending now over USD 1 billion is preparing for a public offering.

In the UK the sector is covered by the Office of Fair Trading because the platforms require a license for their debt administration activities. The Peer-to-Peer Finance Association (a trade body) sets out principles that must be adhered to. The industry has requested formal regulation to enhance credibility and in December 2012 the UK government announced plans to regulate peer to peer lending through the Financial Conduct Authority (FCA). This may foster further growth. The UK government has pledged GBP 55 million of government funding to different peer to peer firms (Zopa, Funding Circle, Boost & co and Credit Asset Management limited) and other finance providers as part of the Business Finance partnership and this too will bring greater credibility (Department for Business, Innovation and Skills (2012)).

The model is also being adopted in China with websites being used to match lenders to borrowers deemed too risky by the banks.

Looking forward, the growth of peer-to-peer lenders is likely to be largest in markets where public data is available covering many of the core credit risk factors. In the UK, the banks, to improve their own access to good quality market wide data, cooperated with companies such as Experian, providing data on borrowings by individual companies and late payments etc. The assumption probably was that the main beneficiaries would be the banks themselves because they would have access to cross market data. This data is now, however, narrowing the gap for non-bank lenders between the information they have access to and the information to which an individual bank has access.

11.3.5. Shadow Trading Activity

The crisis led to a substantial shakeout of the hedge fund industry both with the disappearance of a number of funds and large net outflows. However, there have been sizeable inflows more recently with net inflows of USD 24 billion in 2010 and H1 2011 combined, (Parker (2011)). Industry estimates point to USD 1 trillion of institutional funds being placed in hedge funds by 2016 (Citi (2012)).

Over time more proprietary trading will shift from banks to hedge funds. The key driver here is the much increased capital requirements for banks' proprietary trading as well as the ring fencing / trading bans being introduced with Volcker, Vickers and Liikanen. Hedge funds are part of a shadow banking world to the extent that they support credit intermediation through the instruments they hold pre-crisis, for example securitisation positions. A key question is the extent to which leverage will build up in that market.

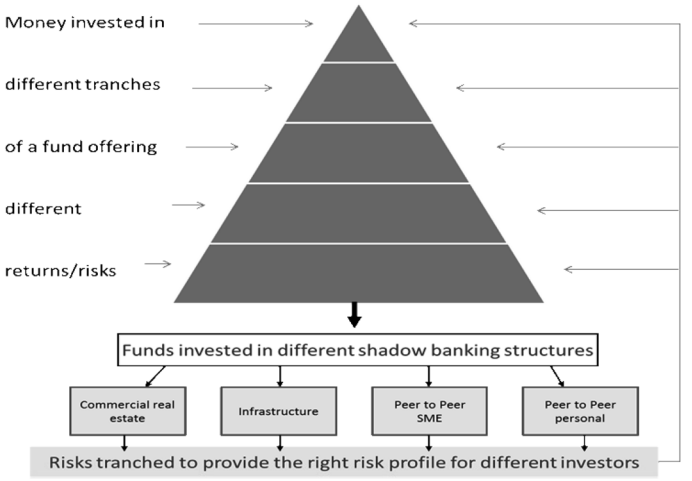
11.4. IMPLICATIONS GOING FORWARD

11.4.1. Potential Growth

Potential growth of all these channels and their importance in the system will depend on a number of factors. One factor is pressure on returns if interest rates remain low. Continuing low interest rates will encourage longer term investors to search for yields and to utilise credit vehicles which provide access to higher yields.

One issue for institutional investors is ease of access to a channel and the ability to place large quantities of funds. The growth of new overarching fund of fund type mechanisms sitting above the new channels would enable institutional investors to access peer-to-peer and other diverse lending channels more easily. This is the path that the fund management industry has already gone down in terms of other investment mechanisms. A possible structure is set out in Figure 11.13. The funds could be invested through a variety of shadow banking mechanisms to give the requisite tranched risk profile.

Figure 11.13: A Model for the Future



Perceived success of the new channels, in the form of access to continuing high achieved yields would attract more investors and even banks to invest in these channels. Clearly credit performance will be an important element in the delivery of returns which are higher than available from traditional investments and stable.

A tipping point could be reached where the volumes magnify hugely, as institutional access becomes easier and as experience grows.

However, it is also possible that as yields improve elsewhere players for whom credit provision is a marginal activity will retreat. Also the lending channels do not offer the liquidity which is available through investment in securities although even here secondary markets in lending exposures could become more common.

11.4.2. Credit Performance

Different channels have different mechanisms for dealing with the credit risks attached to lending and the success of these mechanisms will affect longer term returns and the reputation of the channel. All credit intermediation has to deal with information asymmetries between the borrowers and lenders.

Banks mix external data including credit bureau data and internal data to assess credit. In the UK information in the current account provides a considerable amount of detail on a company or individual's expenditure and income patterns, although there is a question whether banks use all the information in as effective a way as possible. The taking of security is used to provide protection where less is known or can be known about the borrower or risks are higher. For example, some UK banks would only lend unsecured to individuals if they had held the individual's primary current account but would extend mortgage finance to a wider range of borrowers. Security of various kinds, particularly property security, is used extensively by banks for higher risk SMEs to reduce loss given default. Likewise finance companies are heavily dependent on collateral. For example, lease providers have much less access to private information than a bank but do have access to security.

Securitisation structures to a significant degree relied on the diversification effects of the large number of loans in the pools, and the housing security for the RMBS. As mechanisms to examine borrower loan documentation and income deteriorated, the diversification proved illusory. In the case of RMBS, this was because of the underlying common risk factors in terms of US house prices and common failings in the mechanisms to review borrowers' credit worthiness and bona fides. The tranching and provision of other credit enhancements such as monoline insurance was also key in making investors confident with the structures but did not remove the concentration risk.

Peer-to-peer lending also relies on diversification – the very small individual exposures. The peer-to-peer intermediaries use public information to assess credit quality and as set out above the gap between this and the banks' internal sources has narrowed because banks provide information on lending to data providers. However, much will depend on the default outcomes. The peer-to-peer lenders do not always have the benefit of the security which banks take for many SME loans, although some do using SPVs to hold security and assets. Nonetheless banks may have more capacity to manage security and, with a large number of defaults, this would give banks an advantage outweighing the benefit that the peer-to-peer lender has in terms of lower costs.

Institutional investors by lending on project finance and commercial property exposures have used security as the protection. However, if they started to invest in peer-to-peer lenders through say a fund of funds mechanism then they would be reliant on diversification – again a large number of individual loans. One lesson from the crisis with regard to RMBS was the danger of relying of security rather than borrower credit assessment. It is possible that some forms of shadow banking may again be too dependent on security at the expense of an over arching credit assessment. This could again encourage some weaknesses/bubbles to develop. If mechanisms developed, as in Figure 11.13, to channel large scale institutional funds into a variety of mechanisms, bubbles could well be exacerbated.

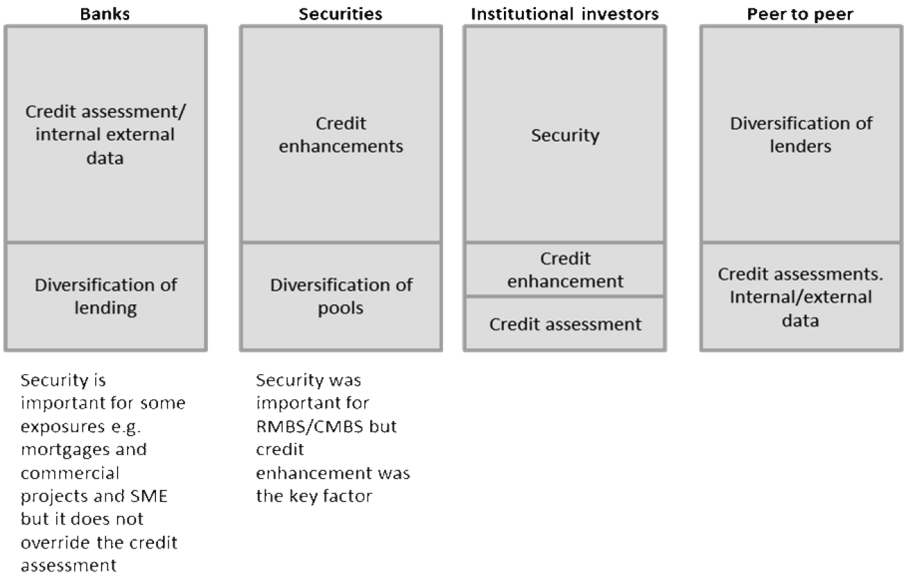
For all of these channels a core issue will be the clustering of defaults in particular periods as conditions deteriorated and if common risk factors lay behind the exposures.

Figure 11.14 below shows the relative reliance on different risk mitigants by different channels. By and large the credit assessment mechanisms are far more developed in banks with shadow banks relying on other mechanisms. Higher reliance on mechanisms such as security can blind the lender to the effects of bubble conditions.

11.4.3. Confidence and Opacity

A core factor in the growth of any channel is the reputation that the channel has and its relative opacity. Reputation partly depends on performance but also how risks are perceived. The further development of securitisation in Europe may well be dependent on the creation of much simpler structures with reduced tranching, smaller clearer prospectuses and high standards for loans going into the pools. 'Skin in the game mechanisms' where originating banks have to invest themselves will also help confidence.

Figure 11.14: Predominant risk mitigants for different credit channels



One issue with all the channels is whether greater growth will lead to increased opacity. The securitisation market started with simpler structures but growth in the market and a drive to place lower quality assets in the pools led to more tranching and other forms of credit enhancement. The generation of loans outside the banking system by thousands of mortgage brokers also added opacity over lending standards, borrower documentation etc.

11.4.4. Risk Assessment

The robustness of the new channels will depend whether the lenders correctly assess the risks and if these are appropriately priced. Large volumes of funds are starting to flow into lending from the institutional investors and there is much more that can move. However, as the market grows so opportunities for low risk lending such as PFI lending in the UK or housing associations will diminish and more funds will have to flow into various types of corporate or personal sector lending or riskier projects. Institutional investors are already investing heavily in commercial property which has caused many banking crises in the past. This raises an issue regarding the quality of the models being used to assess the risk. Here many of the approaches treat lending as if it was a corporate bond and do not fully recognise the illiquidity and its implications. In a structure such as that set out in Figure 11.13 the fund itself could set up a risk assessment mechanism of a size and quality that would be difficult for any one institutional investor.

11.4.5. Regulation

Another factor which will affect growth is the regulation of shadow banking. This is a two edged sword. For a new market like peer-to-peer lending regulation is seen as positive because it will add to credibility. However, more regulation will narrow the cost advantage of some channels relative to banks. Relative regulation of banks and insurance companies will also affect shadow banking. It is too early to say where regulation will get to. The FSB (2012b) set out a possible framework for strengthening oversight and regulation of shadow banking. This focussed on five economic areas when assessing the risk in shadow banking and the need to put in place a policy toolkit including forward looking and proportionate regulation. The five key areas are:

- Management of client cash pools with features that make them susceptible to runs;
- Loan provision that is dependent on short term funding;
- Intermediation of market activities dependent on short term funding or secured funding;
- Facilitation of credit creation;
- Securitisation and funding of financial entities.

The policy toolkits would be tailored to the economic functions. Interestingly the key areas encompass the sectors which, backward looking, were identified with the crisis-securitisation, money market mutuals, repo. Facilitation of credit creation is identified but in the FSB paper the focus is on quasi bank entities rather than platforms and structures to enable institutional investors to make direct loans.

One lesson from the past is that poor risk assessment or due diligence can create foundations which will lead to systemic problems. This may be outside any quasi bank structure.

Over time, as shadow banking becomes more extensive, the regulation will tighten but it may miss some growing concentration.

11.5. CONCLUSIONS AND FINANCIAL STABILITY IMPLICATIONS

The past 40 years have seen a variety of non-bank or shadow banking channels develop and sit at the heart of various banking crises. Undoubtedly regulation of banks has been one factor behind the growth of shadow banking, although some areas like leasing and factoring have grown up to provide specialist finance mechanisms. The 1990s and 2000s saw ever growing complexity in shadow banking

with increasingly opaque securitisation structures and credit enhancements including monoline insurance. Since the crisis the range of channels has proliferated with new approaches like lending platforms starting to move credit intermediation into new areas. Search for yield, which drove many of the structures in the run up to the crisis, is still an important factor in the post crisis world but, with suspicion of securitisation, is driving the new mechanisms.

It is too early to say where this evolution will take the markets and many mechanisms are at an early stage of development. At the moment the direction of travel is towards fragmented approaches without the intertwining across the financial system that was at the heart of the crisis. But it is possible that mechanisms and platforms will become linked together possibly through fund of funds arrangements to allow more efficient placement of large volumes of institutional funds and opacity and interconnectedness will again ensue. Profitable mechanisms will encourage more and more large players to find a way, including banks, of participating. The issue then becomes what the fault lines are in the activities and the hidden concentrations which develop. The focus since the crisis has been on leverage and liquidity but poor quality credit assessments have been at the heart of most crises as well as the last in terms of mortgage origination by mortgage brokers.

There is a pattern in the growth of markets which can be characterised as a move from diverse and high quality to interconnected and lower quality as larger and larger investments are made to benefit from yield. This results from funds flowing into the channel outweighing the traditional investments. It is quite possible that this will also be the result of the growth in the new shadow banking channels as low yields elsewhere persist.

Another, quite different risk, is that with a wide range of new entrants into direct credit extension, an increase in default rates or an improvement in yields elsewhere could lead to a sudden falling away in the provision of credit through these channels. Going forward with high capital requirements and leverage ratios banks will not be able to concertina balance sheets in the same way as in the past, limiting ability to take up any slack if shadow banks retreat, with damaging economic consequences.

It is too early to say which path is most likely and indeed the first outcome could lead to the second.

REFERENCES

ADMATI, A.R., DEMARZO, P.M., HELLWIG, M.F., PFLEIDERER, P., 2011, "Fallacies, Irrelevant Facts and Myths in the Discussion of Capital Regulation; Why Bank Equity is Not Expensive", *Stanford GSB research paper*, No. 86.

AFME, 2012, *Securitisation Data Report* Q4:2012, prepared in partnership with SIMFA.

AMATO, J.D., MORRIS, S., SHIN, H.S., 2003, "Communication and monetary policy", *BIS Working Papers*, No. 123, Monetary and Economic Department. Bank for International Settlements.

AYADI, R., 2009, "SME financing in Europe: measures to improve the rating culture under the new banking rules", in *Financing SMEs in Europe*, *SUERF Studies 2009/3, SUERF – The European Money and Finance Forum*, Vienna.

BANK FOR INTERNATIONAL SETTLEMENTS, 2012, 82nd Annual Report, 1 April 2011-31 March 2012, Bank for International Settlements.

BANK OF ENGLAND AGENTS, 2012, *Agents' summary of business conditions*, August 2012, Bank of England.

BANK OF ENGLAND, 1974, *The Supervision of Banks*, Memorandum by the Bank of England, Bank of England.

BASEL COMMITTEE ON BANKING SUPERVISION, 2010, *Basel III: A global regulatory framework for more resilient banks and banking systems*, Bank for International Settlements, December 2010 (rev June 2011).

BASEL COMMITTEE ON BANKING SUPERVISION, 2013, *Basel III: The Liquidity Coverage Ratio and liquidity risk monitoring tools*, Bank for International Settlements.

BASEL COMMITTEE ON BANKING SUPERVISION, 1996, *Amendment to the Capital Accord to Incorporate Market Risks*, Bank for International Settlements.

BERGER, A.N., UDELL, G.F., 2004, *A More Complete Conceptual Framework for SME Finance*, Prepared for presentation at the World Bank Conference on Small and Medium Enterprises: Overcoming Growth Constraints, World Bank MC 13-121.

BLOMMESTEIN, H.J., KESKINLER, A., LUCAS, C., 2011, "Outlook for the Securitisation Market", *OECD Journal: Financial Market Trends*, Volume 2011 – Issue 1, OECD.

CAREY, M., POST, M., SHARP, S.A., 1996, "Does Corporate Lending by Banks and Finance Companies Differ?", Evidence on Specialization in Private Debt Contracting, Federal Reserve Board.

CITI, 2012, *Institutional Investment in Hedge Funds: Evolving Investor Portfolio Construction Drives Product Convergence*, A Prime Finance Business Advisory Services Publication.

DELL'ARICCIA, G., IGAN, D. and LAEVEN, L., 2008, "Credit Booms and Lending Standards: Evidence from the Subprime Mortgage Market", *IMF Working Paper*.

DEPARTMENT FOR BUSINESS, INNOVATION AND SKILLS, 2012, *Small businesses offered GBP 110 million of new finance*, BIS press office, December, Available at: http://news.bis.gov.uk/Press-Releases/Small-businesses-offered-110-million-of-new-finance-684c2.aspx.

EUROPEAN BANKING AUTHORITY, 2011, *The EBA details the EU measures to restore confidence in the banking sector*.

EUROPEAN CENTRAL BANK, 2010, *Survey on the Access to Finance of Small and Medium-sized Enterprises in the Euro Area: Second half of 2009*, The European Central Bank.

EUROPEAN COMMISSION, 2013, *CRD IV/CRR – Frequently Asked Questions*, Brussels, 21 March 2013.

FEDERAL DEPOSIT INSURANCE CORPORATION, 2008, *Covered Bond Policy Statement, Final statement of policy*, Vol. 73, No. 145, Federal Deposit Insurance Corporation.

FINANCIAL STABILITY BOARD, 2012a, *Global Shadow Banking Monitoring Report*, Financial Stability Board Consultative Document.

FINANCIAL STABILITY BOARD, 2012b, "Strengthening Oversight and Regulation of Shadow Banking. A Policy Framework for Strengthening Oversight and Regulation of Shadow Banking Entities", *Financial Stability Board Consultative Document*.

FINANCIAL STABILITY BOARD, 2012c, "Securities Lending and Repos: Market Overview and Financial Stability Issues, Interim Report of the FSB Workstream on Securities Lending and Repos", *Financial Stability Board Consultative Document*.

FRASER, S., 2009, *Small Firms in the Credit Crisis: Evidence from the UK Survey of SME Finances*, Centre for Small and Medium-Sized Enterprises, Warwick Business School, University of Warwick, Economic & Social Research Council.

GIBSON, W.C., 2012, *Money Market Funds: Success Must Not Go Unpunished*, The Freeman: Foundation for Economic Education, April 26, Available from: www.fee.org/the_freeman/detail/money-market-funds-success-must-not-go-unpunished.

GORTON, G., METRICK, A., 2010, *Regulating the Shadow Banking System*, Yale and NBER.

HORDAHL, P., KING, M.R., 2008, "Developments in Repo Markets During the Financial Turmoil", *Bank for International Settlements Quarterly Review*.

INSTITUTE OF INTERNATIONAL FINANCE, 2012a, *"Shadow Banking": A Forward-Looking Framework for Effective Policy*, Institute of International Finance, Washington DC.

INSTITUTE OF INTERNATIONAL FINANCE, 2012b, *Specific Impacts of Regulatory Change on End-Users: Initial Report*, Institute of International Finance, Washington DC.

INTERNATIONAL MONETARY FUND, 2012, "Global Financial Stability Report. The Quest for Lasting Stability. World Economic and Financial Surveys", *IMF Publications Services*, Washington DC.

JACKSON, P., FURFINE, C., GROENEVELD, H., HANCOCK, D., JONES D., PERRAUDIN, W., RADECKI, L.,YONEYAMA, M., 1999, *Capital Requirements and Bank Behaviour: The Impact of the Basel Accord*, No. 1 – April, Basel Committee on Banking Supervision Working Papers.

JACKSON, P., 2011, "A false sense of security: Lessons from the Crisis for Bank Management and Regulators", *SUERF Study 2011/2: Regulation and Banking after the Crisis*, Chapter 7, pp. 101-115.

KAWAI, M., 2003, *Japan's Banking System: From the Bubble and Crisis to Reconstruction*, Institute of Social Science University of Tokyo, Japan, PRI Discussion Paper Series (No. 03A-28).

KRAEMER-EIS, H., LANG, F., 2012, "The importance of leasing for SME finance. European Investment Fund", *Working Paper* 2012/15, EIF Research & Market Analysis.

MISHKIN, F.S., EAKINS, S.G., 2008, *Financial markets and Institutions*, 6th International edn., Addison-Wesley Longman, Amsterdam.

MODIGLIANI, F., MILLER, M.H., 1958, "The Cost of Capital; Corporation Finance and the Theory of Investment", *The American Economic Review*, Vol. 48, No. 3, pp. 261-297.

OXFORD ECONOMICS, 2011, *The Use of Leasing Amongst European SMEs*, A report prepared for Leaseurope.

PARKER, J.L., 2011, "Post-Crisis, Nimble Hedge-Fund Strategies Survive", *CNBC* 12 September, available from: www.cnbc.com/id/44325814/PostCrisis_Nimble_HedgeFund_Strategies_Survive.

PARLIAMENTARY COMMISSION ON BANKING STANDARDS, 2012, *Banking Standards*, Written Evidence in response to call for evidence made on 15 October 2012. A joint committee of the House of Commons and the House of Lords.

PENDLEY, D., COSTELLO, G., KELSCH, M., 2007, "The Impact of Poor Underwriting Practices and Fraud in Subprime RMBS Performance", *US Residential Mortgage Special Report*, Fitch Ratings.

POSCHMANN, J., 2012, "The Shadow Banking System – Survey and Typological Framework", *Working Papers on Global Financial Markets*, No. 27, Global Financial Markets.

POZSAR, Z., ADRIAN, T., ASHCRAFT, A., BOESKY, H., 2010, "Shadow Banking", *Staff Reports* No. 458, Federal Reserve Bank of New York.

POZSAR, Z., 2008, *The Rise and Fall of the Shadow Banking System*, Available at Moody's Economy.com, Regional Financial Review/July.

SCHAPIRO, M.L., 2012, *Testimony on "Perspectives on Money Market Mutual Fund Reforms"*, Speech before the Committee on Banking, Housing, and Urban Affairs of the United States Senate, June 21, 2012. U.S. Securities and Exchange Commission.

SECURITIES AND EXCHANGE COMMISSION, 2008, *Order Instituting Cease-and-Desist Proceedings pursuant to Section 8A of the Securities Act of 1933, Making Findings, and Imposing a cease-and-desist order*, Release No. 8984, November 24, 2008.

SECURITIES INDUSTRY AND FINANCIAL MARKETS ASSOCIATION, 2008, *Research report*, February, Volume III, No. 2, SIFMA Research Department.

STANDARD & POOR'S, 2009, Methodology And Assumptions For Rating U.S. RMBS Prime, Alternative-A, And Subprime Loans, Global credit portal, RatingsDirect.

12. The 2007-Financial Crisis – a EURO-pean Perspective

Juan Ayuso and Roberto Blanco[1]

12.1. Introduction

In the summer of 2007, the collapse of a relatively small segment of the financial markets in the USA – the so-called subprime mortgage market – triggered a severe economic, financial and fiscal crisis that affected mainly, although not exclusively, the advanced economies. Six years later, the crisis is still not over, in particular in Europe and more concretely in the euro area, which is the focus of this chapter. At the euro area level, real GDP in 2012 was below its 2008 level. At the country level, the IMF expects Greek GDP still to remain 13 pp below its 2008 level by 2017. According to the same projections, by that date Spain and Italy would be about to recover their pre-crisis GDP levels. Unemployment affects nearly 12% of the working population, more than 3 pp above the figure at the end of 2008. But the increase has been around 19 pp in Greece, 11 pp in Spain and 8 pp in Portugal. In the financial realm, according to the European Commission, banks across the European Union had received financial support from their governments to the tune of nearly 13% of GDP between 2008 and 2011, including capital injections, balance-sheet clean-ups and guarantees for bond issuances. Several entities have been resolved and not surprisingly, faced with recession, high unemployment and financial instability problems, several governments have seen their current and contingent liabilities soar and then feed back into growth and financial stability problems. Three countries (Greece, Ireland and Portugal) are under a fully fledged EU-IMF financial assistance programme since their governments lost market access, and a fourth one (Spain) is under a specific EU programme to assist the restructuring and recapitalisation of its financial system. Last but not least, the relatively high degree of financial integration attained in the euro area has been seriously dented. This has posed a problem to the European Central Bank, whose expansionary monetary policy measures in respect of households and firms in the different Member States have been quite uneven due to the impairment of the monetary policy transmission mechanism.

In their extremely rich review of the financial crises of the last eight centuries, Reinhart and Rogoff (2009) maintain that the economics profession has an

[1] The views in this chapter are the authors' views. These views may or may not coincide with those of Banco de España or SUERF. We thank the editors of this volume for their friendly and very much appreciated comments, Víctor García-Vaquero for his invaluable help with the review of the literature and Fernando Nieto and José A. Cuenca for outstanding research assistance.

unfortunate tendency to time myopia. By looking at each fresh crisis through the lens of just the latest data, the illusion is created that "this time is different". While not disputing this idea that most crises share many common features which the passage of time tends to blur, we believe that the financial crisis that the euro area is still undergoing shows several relevant idiosyncratic components that deserve close attention. In a nutshell, the main thrust of this chapter could be summarised by noting that while from a country-by-country perspective the current crisis in Europe could perfectly match the general pattern identified by Reinhart and Rogoff, the fact that those countries were part of a monetary union that was not designed to deal with any kind of crisis, be it financial, economic or fiscal, added an extra dimension that has rendered the crisis more severe and more lasting. To be clear, we are not raging against the euro. On the contrary. Our conclusion is that an overhaul of the governance of the euro is urgently needed to better underpin the very positive contribution that EMU has made and has still to make to the welfare of European citizens. Some promising steps have already been taken in this direction, but much remains to be done.

Against this background, the chapter is organised as follows. Section 12.2. provides a short overview of financial crises by summarising the main findings of the literature in that field. The focus is on the financial crises over the last 50 years. Section 12.3. seeks to frame the main financial and economic developments in the euro area before the 2007 financial crisis. Section 12.4. reviews the unfolding of the crisis and its highlights, while the main elements of the institutional set-up of the euro that propelled it are analysed in Section 12.5. Sections 12.6. and 12.7. summarise the main progress made and proposals to deal with the flaws identified, while Section 12.8. offers the main conclusions of the chapter.

12.2. A SHORT OVERVIEW OF FINANCIAL CRISES OVER THE LAST 50 YEARS

Financial crises are recurrent episodes in both emerging markets and developed countries. There are many types of financial crises including banking, balance-of-payments (or sudden stops), inflation, currency, stock market and debt (external, domestic or sovereign) crises. The literature on financial crises is largely segmented by types of crises. Many papers focus on the identification of these episodes using different methodologies (including both quantitative indicators and event analysis techniques, depending on the type of crisis) and analyse their main patterns in terms of the duration, the impact on macroeconomic and financial variables, the policy reactions and the main causes. Useful references include Minsky (1975) and Kindleberger (1976). More recent studies include Reinhart and Rogoff (2009), which reviews the history of financial crises over the last eight

centuries using a unique database, and Laeven and Valencia (2012), which focuses on financial crises between 1970 and 2011. Claessens and Kose (2013) provide a selected survey of this literature. Broadly speaking, the available studies on this field tend to stress that, although financial crises come in many different forms, they share some common elements. In particular, they often tend to be preceded by asset booms, an excessive debt accumulation by one or more sectors (governments, banks, corporates and consumers) that make the economy vulnerable to a crisis of confidence and by a booming economic period. Reinhart and Rogoff (2009) argue that, in many episodes, what they call "this-time-is-different syndrome" is present before the crisis. They explain this syndrome as the (obviously wrong) belief that financial crises only happen to other people in other countries at other times. The boom that we are currently envisaging, however, is built on sound fundamentals.[2]

Once the crisis unfolds, one or more of these elements are often observed: substantial changes in credit volume and asset prices, severe disruptions in financial intermediation and the supply of external financing to various agents of the economy, large balance sheet problems and large scale government support.

The literature on financial crises shows that these episodes tend to come in waves and concentrate in some regions around specific events. Examples of crisis waves in the recent period include the Latin America debt crises, in the 1980s; in the early 1990s, the Nordic banking crises and the European Exchange Rate Mechanism currency crises; in the late 1990s, the East Asian crises; in the 2007-2009, the suprime crises; and the sovereign debt crisis in Europe that started in 2010.

This literature also shows that there is some overlap between the various types of crises. More specifically, currency crises tend to overlap with banking crises – the so called twin crises (Kaminsky and Reinhart (1999)). Additionally, sudden stop crises sometimes overlap with currency crises and with sovereign crises – triple crises. Out of the 431 financial crises reported by Laeven and Valencia (2012) over the period 1970-2011, they consider 68 as twin crises – i.e. they involved two types of crises- and 8 are triple crises – i. e. they involved three types of crises.

Some papers show that there are a number of common patterns too in the sequencing of financial crises. In particular, the evidence provided shows that banking crises tend to precede currency and sovereign debt crises (Reinhart and Rogoff (2011); Laeven and Valencia (2012)). For example, in the database of Laeven and Valencia (2012) 21% of banking crises are followed by a currency crisis in the same country within three years, whereas the opposite happens in the 16% of the banking crises.

[2] Others, such as Shiller (2000), use the term "new era economic thinking" to express a similar idea, i.e. the popular perceptions during speculative market expansions that the future is brighter or less uncertain than it was in the past.

Laeven and Valencia (2012) identify 147 banking crises, of which 13 are considered borderline events, over the period 1970-2011. They show that many countries experienced more than one of these types of crisis during this period. They also find that crisis cycles frequently coincided with credit cycles. More specifically, out of the 129 banking crises episodes for which credit data are available, 45 were preceded by a credit boom. They also identify 218 currency crises over the same period and 66 sovereign crises, of which 10 and 3 episodes occurred during 2008-2011, respectively.

Financial crises have generally large economic costs, although the impact varies considerably depending on the type and depth of the crisis. Claessens, Kose and Terrones (2013) show that recessions associated with financial crises tend to be unusually severe, result in much larger declines in real economic activity and their recoveries tend to be slow.

Generally, banking crises tend to have higher macroeconomic costs and tend to last longer. In their analysis of the banking crises between 1970 and 2011, Laeven and Valencia (2012) report that the average duration was 2 years, the average output loss was 23% of GDP and the average fiscal cost was 7% of GDP. Interestingly, they find that in advanced economies output losses were larger than in emerging and developing countries. They argue that banking crises are more disruptive for advanced economies because they have deeper financial systems. By contrast, they find that fiscal costs are larger in developing and emerging economies.

In their analysis of post-World War II bank-centered financial crises in advanced economies (excluding the episodes after the subprime crisis), Reinhart and Rogoff (2009) show that the average per capita GDP growth was negative for the starting year of the crisis and for the following two for the five more severe systemic crisis (referred to as the "Big Five") that include the following: Spain (1977), Norway (1987), Finland (1991), Sweden (1991) and Japan (1992). The largest output loss (peak-to-trough) in real per capita GDP was observed in the 1991 crisis in Finland with around 12% fall. This crisis also lasted the longest (4 years). They also show that these crises had a profound impact on asset prices. Declines in house prices in real terms was highest again in the 1991 crisis in Finland (around 50%, peak-to-trough), but was also significant in the 1987 crisis in Norway and in the 1992 crisis in Japan (around 40% and 35%, respectively). Contraction in equity prices was the highest in the 1977 crisis in Spain (around 65%, peak-to-trough). These severe systemic crises had also a profound impact on the fiscal positions of countries. For instance, the cumulative increase in real public debt in the three years following the start of the crisis was around 180% in the 1991 crisis in Finland, and more than 100% in the 1977 crisis in Spain.

For the other 13 post-World War II bank-centered milder financial crises in advanced economies analysed by Reinhart and Rogoff (2009), per capita GDP growth fell but was, on average, positive during the crisis.

As regards the most recent financial crises, Reinhart and Rogoff (2009) show that the subprime crisis that started in 2007 was more severe for the United States than the average Big Five crises in terms of output losses and contraction of house and equity prices. Using a composite index of crisis severity that takes into account the number of crises occurring at the same time in a particular country, they also show that the post-2007 episode has been unique since World War II in terms of both its severity and global scope. Laeven and Valencia (2012) also show that the number of banking crises after 2007 is unprecedented. In the period 2007-2011 they identify 17 systemic banking crises and 8 borderline cases (of which 13 and 7 take place in Europe, respectively). Some of these crises rank among the costliest crises since 1970 in terms of both output losses and fiscal outlays.

12.3. THE EURO AREA FINANCIAL MARKETS BEFORE THE CRISIS

The global roots of the current financial crisis have long been discussed (see, among others, Zingales (2008); Brunnermeier (2009) or Kashyap, Rajan and Stein (2009)). Most authors tend to agree that the experiences of the Asian – late 1990s – and the ICT – early 2000s – crises led to a "savings glut" (see Bernanke 2005) as governments in emerging economies reined in public deficits, and corporate investment in advanced economies lagged behind GDP growth when recovery started. Deprived of productive investment options, funds searched for yield in other less known and less productive markets. Real estate-related assets – both real and financial – were ultimately the recipient of a major portion of those financial resources. Overly fierce competition for yield brought about increasing risk assumption and, ultimately, risk undervaluation, against a backdrop of market complacency and poor transparency. Policymakers also played a role and, with hindsight, it is difficult to argue that they could not have done better. Central bankers and financial regulators have been the main targets of the criticism. The former, because they may have kept interest rates too low for too long, ignoring the negative effects of their policies on financial stability. The latter, because they failed to see the limits and the dangers of relying on market self-regulation. Prudential supervisors have also been accused of behaving in an excessively micro-oriented way, ignoring the aggregated macro-dimension of bank behaviour. To be fair, their mandates were micro-oriented and it is not by chance that one of the already visible implications of the crisis for economic policy has

been the creation of incipient macroprudential authorities such as the Financial Stability Board or the European Systemic Risk Board[3].

Europe and in particular the euro area were no exception to these general trends. But the launch of the single currency in 1999 was a genuine idiosyncratic event that deserves careful consideration[4].

In a monetary union such as EMU the interest rate and the exchange rate cease to be economic policy tools available to stabilise member countries' domestic economies. Mundell (1961) explained the theoretical conditions for a monetary union to work, i.e. the features of the so-called Optimum Currency Area (OCA). Not surprisingly, he concluded that either the economies that link together in a monetary union should be "equal enough" (i.e. they share rather similar economic structures and are exposed to roughly the same kinds of shocks) or the area should count on a number shock absorbers powerful enough to offset the effects of (asymmetric) symmetric shocks to (even) uneven economies. Labour mobility and a soft form of shared fiscal policy rank high in the list of those potential shock absorbers. Interestingly, highly integrated financial markets may also contribute to making a monetary union an OCA, although this possibility has received much less attention in a branch of the literature that has focused mainly on the real side of the economies (for a valuable exception, see Ventura (2009)).

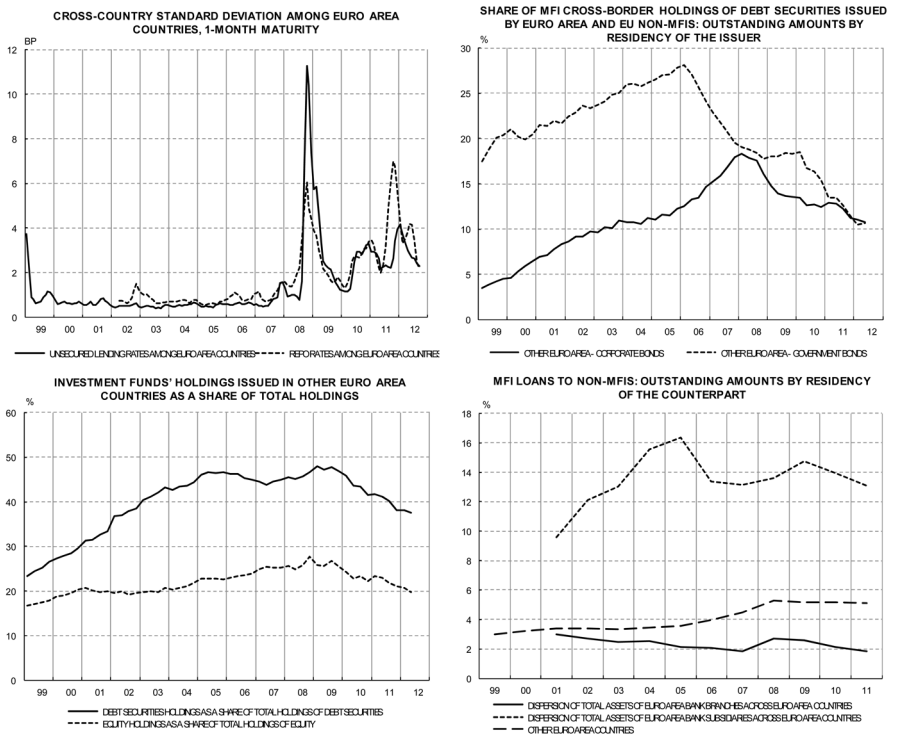
It is not easy to measure the contribution of the single currency to the degree of integration of financial markets in Europe. As commented before, the euro was launched at a time when many other relevant changes were taking place, so it is difficult to disentangle its genuine effects. At any rate, a single currency clearly reduces transaction costs, increases market liquidity and depth, and eliminates exchange rate risk for its members[5]. It is also true that the options to diversify portfolios through the currency composition of the assets are fewer, but the available set of exchange rates was still wide enough after 1999.

In March 2007, the ECB released its first annual report on financial integration in Europe (ECB (2007)). From 1999 and before the crisis erupted in 2007, financial market integration proceeded at different speeds in the different segments of the European markets but showed a clear positive trend. Broadly speaking, the closer the market segment was to the single monetary policy, the more advanced the financial integration process. Thus, the unsecured money market quickly moved towards a fully integrated one in the euro area. The repo market had also by then attained a very high degree of integration. Government and corporate bond markets ranked next in the list, and integration had also reached a sound level in the equity markets. On the contrary, retail banking markets were much

[3] For a before-the-crisis defense of macroprudential supervision see Borio (2003).
[4] See Chapter 1 of this volume on global and European monetary arrangements.
[5] See Chapter 6 of this volume on financial market integration.

less integrated, which was not a minor issue given the crucial role that banks played – and still play – in financing not only European households but also most European non-financial corporations, including SMEs. Figure 12.1 offers some relevant indicators that illustrate all these developments.

Figure 12.1: Financial Integration Indicators



The euro was not the only driving force that fostered financial market integration in EMU. Progress in information and communication technologies, for instance, is likely to have played an important role as well. Yet Lane (1999) and Kalemli-Ozcan *et al.* (1999) showed that the euro actually made a genuine contribution to financial integration in Europe. Interestingly, they show as well how higher financial market integration contributed to making EMU an OCA through enhanced risk-sharing mechanisms that allowed for more income and consumption smoothing within the euro area.

While the positive effects of the euro on the European financial markets were quite clear and commonly accepted before the crisis, the potential risks inherent in a monetary union with a single monetary policy but multiple national governments and multiple domestic regulators and prudential supervisors received much

less attention. In June 2007, for instance, the ECB showed "greater concern that some asset price valuations could prove vulnerable to several potential adverse disturbances" (ECB (2007)). Among those potential adverse disturbances, three were highlighted. First, the ECB warned against the risk of an abrupt decline in financial market liquidity, possibly triggered by a risk reassessment. Second, it was worried about the consequences of corporate releveraging based on business models which, like the infamous "originate to distribute", could have weakened the incentives for assessing credit risks. And the third source of risk identified was an abrupt unwinding of the so-called global imbalances. Of course, these were actual risks at the time and subsequent events validated the ECB's fears. The ECB's views, on the other hand, were well in line with those of many other relevant supranational institutions or international analysts (see, for instance, IMF 2007). But what is worth noting at this point is that all those risks were global, they were not – or not only – European. They affected global financial markets. European financial markets were not different and the euro hardly made any difference in that regard. Just to highlight the contrast it is worth quoting the first paragraph of the executive summary of the October 2012 IMF Global Financial Stability Report: "Downside risks to financial stability have increased since the April 2012 GFSR [...] the euro area crisis remains the principal source of concern. Tail risk perceptions surrounding currency redenomination continue to fuel a retrenchment of private financial exposures to the euro area periphery".

12.4. THE UNFOLDING OF THE CRISIS IN THE EURO AREA

Since 2005, the delinquency ratios of the so-called subprime mortgages in the US had been increasing. By the first quarter of 2008, they had jumped from levels around 6% to more than 24%[6]. This was a market worth USD 1.2 trillion, roughly 12% of the US residential mortgage market at the time (see Frame *et al.* (2008)). However, its actual traction on the global financial markets was much higher. First, because of a number of financial innovations based on securitisation and re-securitisation techniques – which in some cases were mainly aimed at circumventing regulatory prescriptions – that had a powerful multiplier effect. Second, because as a result of the erosion of the subprime mortgage market, credit rating agencies (CRAs) decided to review their methodology to rate a wide variety of asset-backed securities including, but not limited to, those backed by pools of subprime mortgages. As a matter of fact, CRAs have received a lot of criticism for assigning, first, excessively high ratings to relatively risky assets and, then, for overreacting in their downgrading decisions when the crisis erupted. While the pro-cyclicality of credit rating agencies had been well documented in the

[6] In the case of adjustable rate mortgages.

literature (see, for instance, Nickell *et al.* (2000)), in a recent paper Hau *et al.* (2012) suggest that rating agencies have also tended to assign more positive ratings to large banks and to those institutions more likely to provide them with additional securities-rating business.

Downgradings, foreclosures and bank losses combined and had a huge negative confidence effect on international investors. In a sense, the collapse of this small segment of the US financial markets was a wake-up call for most international investors, who were thus reminded of the basic principle in finance that expected returns and assumed risks always move in the same direction. Their reaction, a massive and uncoordinated exit from ABS and other markets, ultimately materialised in the liquidity risks that the ECB – see above – had identified.

When liquidity tensions reached the money markets – a pivotal component of the monetary policy transmission mechanism – central banks acted resolutely. Across the board, their reaction was rather similar (see Ayuso and Malo de Molina (2011)). In EMU, the ECB activated a generous liquidity provision policy by raising, first, the number of liquidity-providing operations and by increasing, later, the volume of funds injected into the system. At the same time, the average maturity of these operations was extended by increasing both the relative weight of the so-called Long-Term Refinancing Operations and their maximum horizon (from 3 to 6 months). Also, the ECB and the FED – and other central banks – activated currency swap lines to deal with liquidity problems in foreign currencies within their respective jurisdictions. It is worth noting the liquidity-oriented nature of all these measures. At that stage, the monetary policy stance was not altered either in Europe or in the USA.

Problems turned to the worst in the autumn of 2008 when Lehman Brothers filed for bankruptcy. As explained in Zingales (2008), extremely high leverage and strong reliance on short-term debt financing were decisive in explaining Lehman's demise. It is also worth remembering that, at the time, there was a lively, open debate about the appropriate balance that had to be struck between preventing systemic risks and avoiding moral hazard problems. With hindsight, too much consideration was paid to the latter, while the systemic consequences of relatively limited shocks – which, however, were to impinge on a highly fragile global financial system – were underestimated. Be that as it may, Lehman's fall seriously eroded the view that some institutions were too big or too systematic to fail, and prompted a further episode of retrenchment in the financial markets. This time, the expansion wave reached the real economy and fuelled a global recession that fed back into financial tensions.

The second stage of the "financial crisis – recession – fiscal crisis" sequence identified by Reinhart and Rogoff had started, and this time the impact on Europe was particularly severe. The deep-rooted reasons why the impact of the second

wave ultimately proved particularly hard in the euro area have to be sought out in the realm of EMU governance. Macroeconomic imbalances had accumulated in several countries before the crisis, putting their domestic financial systems in a vulnerable position. High financial integration linked all those vulnerabilities together, thus acting as an amplifier for any individual shock. But no efficient mechanism was available to stop the build-up of imbalances and shock contagion. Nor was any mechanism in place to deal with a crisis in a Member State that could spread to other members and ultimately undermine the soundness of the euro itself.

It is a well-known fact that the interest rate level that was appropriate for the EMU in 1999 and in the following years was too low for some of its founding members. Too-low interest rates boosted domestic demand and fed price pressures in those countries (see Figure 12.2). Domestic policymakers did not make use of the supply or demand policies still in their hands to offset such pressures (see, for instance, some relevant fiscal variables in Figure 12.3, although a similar picture could be obtained by looking at supply structural policies). With nominal exchange rates fully fixed, prices pressures translated into competitiveness losses (see Figure 12.4). As is explained in the next section, the institutional set-up of EMU was not well-equipped to prevent that accumulation of vulnerabilities and the tools available were not used in the most efficient way.

Figure 12.2: Inflation

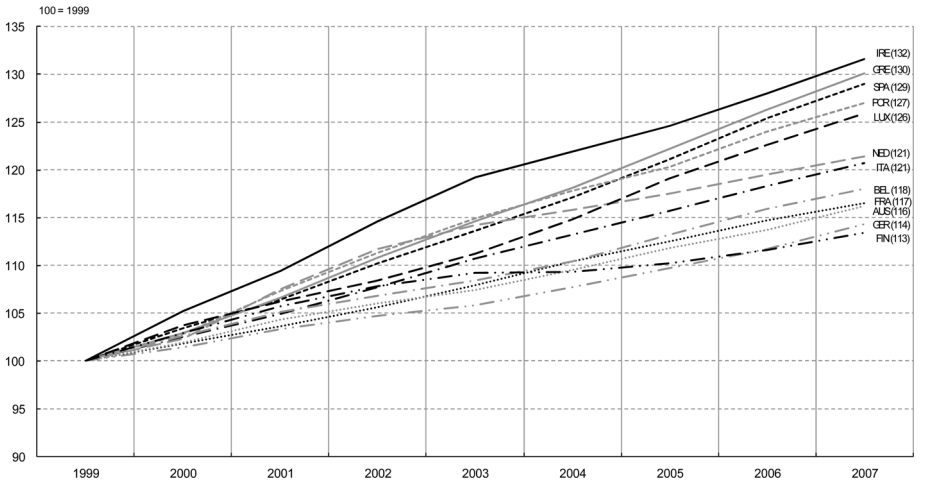


Figure 12.3: Fiscal Indicators

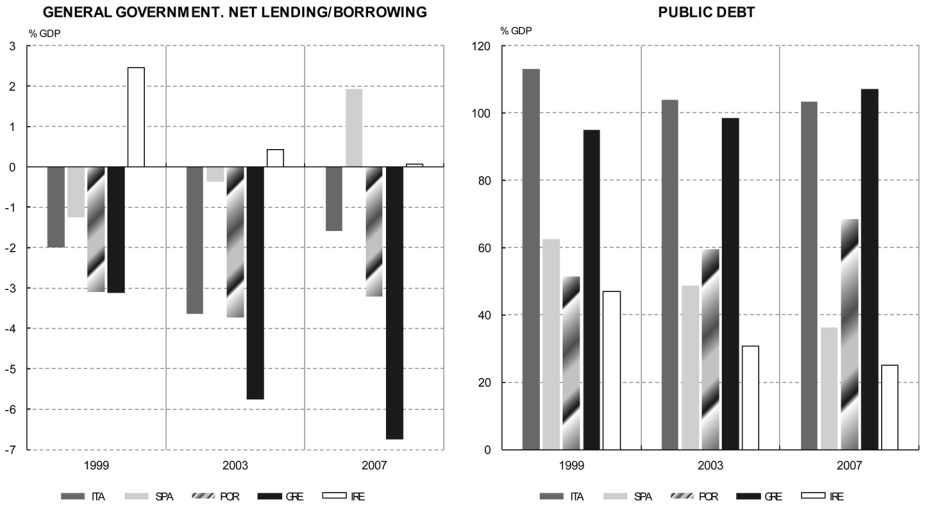
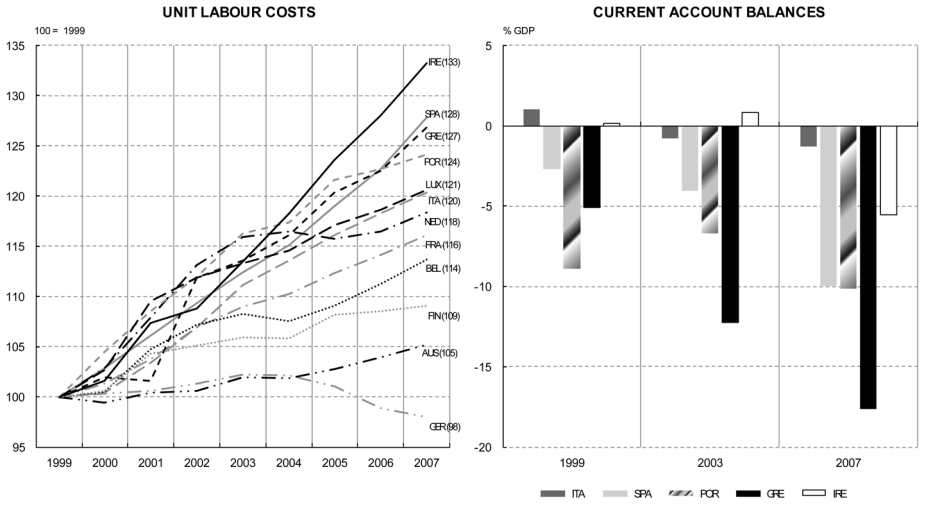


Figure 12.4: Competitiveness Indicators



At that point, financial markets could have played a stabilising role. Higher risk premia on bonds could have been required of governments in countries where imbalances were accumulating. Their banks, the main financial intermediaries in the euro area, could have found greater difficulty in raising the financial resources needed to finance growing current account deficits that mainly reflected competitiveness losses. Rather, the elimination of the exchange rate risk and the growing integration of the financial markets in Europe brought about by the euro greased

those international financial flows in a context where, as commented, risks were globally underpriced. As a matter of fact, some financial systems grew in excess and accumulated serious latent risks as later developments have shown. Actually, Europe cannot be considered an exception in this regard – think, for instance of the USA. Yet the single currency added an extra gear to the process that was not accompanied by any reform aimed at empowering the capacity of the system to apply the brakes.

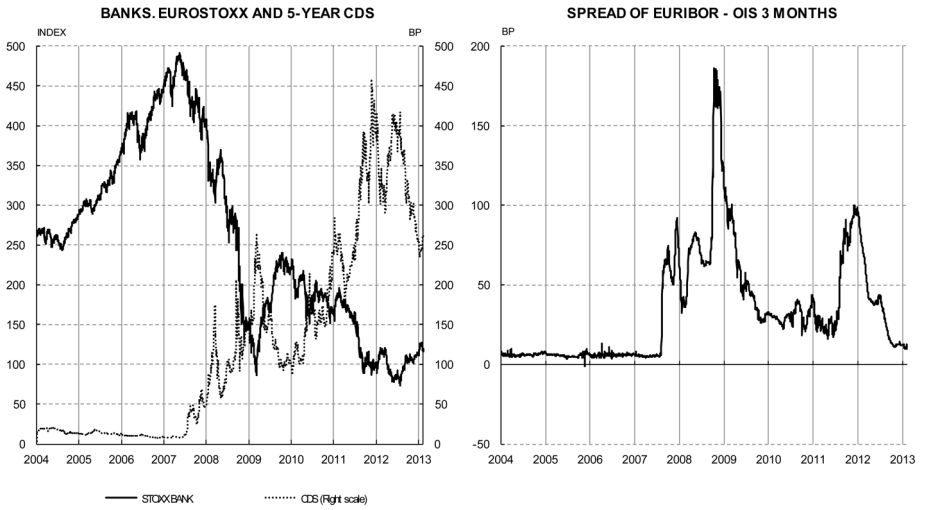
For readers interested in an exhaustive description of the events that followed the fall of Lehman Brothers, there are many timelines of the crisis available (for instance, the ECB, the St. Louis Fed, the University of Pennsylvania and several others such as The Guardian produce their own timelines, the reader may also find a timeline going back to the 1960s on one of the last pages in the present volume). In what follows we simply highlight those events that help us to depict the global picture.

The valuation write-downs on credit securities and the retrenchment of activity in global financial markets that followed the eruption of the subprime crisis in 2007 had an important effect on European banks, mainly on those more oriented towards investment activities. But overall, they proved quite resilient to, so to speak, the first wave of the crisis. Previous profitability performance (according to the ECB, the largest and most complex banks in the euro area posted a median ROE over 20% in the first half of 2007) and sound capital positions (their median solvency ratios stood at 11%) are the most plausible explanation for this resilience. Only some German banks that had invested heavily in real estate-related structured financial products needed to be recapitalised. Outside the euro area, the emergency loan to Northern Rock was probably the most outstanding development.

The picture changed when the second wave of the financial crisis reached Europe. As the too-big-/too-systemic-to-fail paradigm weakened and GDP growth turned into recession, uncertainty over the actual liquidity and solvency position of many banks led to a severe loss of confidence that blocked wholesale funding markets and nearly stalled unsecured money markets (see Figure 12.5). It is worth remembering that the complexity of many of the new structured financial products made it extremely difficult to figure out who was actually exposed to what.

In September 2008, two big Euro area banks (the Benelux Fortis and the French-Belgian-Luxembourg Dexia) had to be rescued. In the following months, a relatively long list of banks needed public capital injections, including also big European or domestic players in Germany (like Commerzbank), France (its six largest banks), The Netherlands (ING), Austria (Kommunalkredit), Belgium (KBC), Portugal (BPN) and Ireland (Anglo). Greek banks joined the list later on.

Figure 12.5: Financial Stress Indicators in the Banking Sector



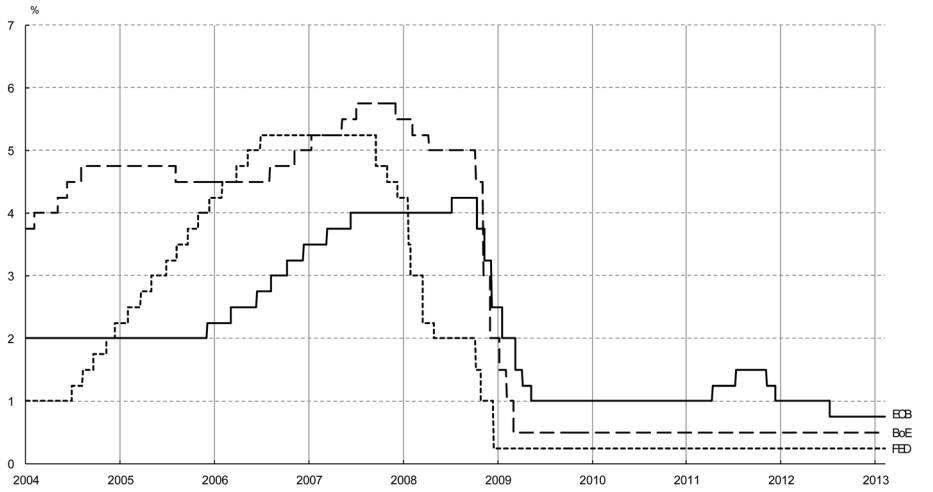
Some Spanish savings banks followed. In the rest of Europe, the difficulties reached the UK (RBS, for instance), Sweden and Iceland.

Policymakers in advanced economies in general, and in Europe in particular, proved to have learnt the lessons of the Great Depression, reacting quickly and decisively when world activity went into recession and financial stability tensions surged. In addition to fiscal stimulus programmes, their partially coordinated actions also included measures in the financial arena. More specifically, in October 2008 the Heads of Government or State of the European Union agreed to extend the coverage of deposit guarantee schemes to enhance depositors' confidence and to prevent bank runs that would have been extremely dangerous. Also, to alleviate the funding problems linked to the closure of wholesale funding markets, governments put in place a policy of government guarantees for fresh bank bond issuance. And to underpin the solvency of some particularly hard-hit banks, fresh public capital was injected into a number of institutions. Various programmes for asset purchases or swaps were also arranged and, later on, coordinated stress test exercises were performed to increase transparency and to reduce investors' uncertainty over the actual situation of the most systemic banks. Asset Protection Schemes and the set-up of the so-called bad banks (like NAMA in Ireland or SAREB in Spain) have also been among the tools wielded[7].

[7] "Bad bank" is, however, an unfortunate label as, first, in most cases the institution set up is not a bank but a non-financial real asset management company. And second, because as the Swedish experience in the late 1990s shows, the institution does not necessarily have to be unprofitable. See Chapter 11 of this volume on shadow banking and off-balance sheet business.

Along these lines, the European Central Bank also made a significant contribution to the broad effort to restore normality. From a macroeconomic perspective, the ECB joined many other central banks in providing a monetary stimulus through aggressive interest rate cuts (see Figure 12.6 – official rates in UK, USA and euro area). Action via the standard arm of monetary policy was complemented with a wide set of non-standard measures aimed, first, at filling the gap that the collapse of the unsecured money markets had created in the distribution of liquidity among European banks. Thus, in October 2008 the ECB decided to provide their counterparties all the liquidity they demanded in its regular open market operations and also fine-tuned its collateral policy to prevent a collateral shortage from potentially creating a bottleneck in liquidity distribution. All in all, the ECB fully took over the role of the non-operational interbank market as liquidity distributor among banks.

Figure 12.6: Official Interest Rates



At the same time, the crisis also impaired the monetary policy transmission mechanism, thus preventing monetary impulses from symmetrically reaching all households and firms across the euro area. This also required action, as keeping the different transmission channels operational fully falls under the central bank remit. The so-called Covered Bond Purchase Programme(s) and the Securities Market Programme (see ECB 2011) are surely the most outstanding examples of the ECB's interventions to repair very relevant links of the chain connecting the MRO rate to the interest rates that determine expenditure and investment decisions by both the private and the public sector. More recently, the approval of the so-called Outright Monetary Transactions has also been instrumental in dispelling mounting doubts over the irreversibility of the euro.

In this regard, it is worth noting that the high degree of financial integration within EMU propelled by the euro before the crisis helped ease shock propagation and contagion when the crisis erupted. There were no circuit breakers able to stop them. Nor, as the crisis unfolded, were there any mechanisms to prevent financial integration from being reversed (see, for instance, ECB (2013)) to the extent that the re-nationalisation of financial flows exerted some extra pressure on those domestic financial systems that were in a more vulnerable position. Again, the governance of the euro proved poorly designed to deal with the crisis.

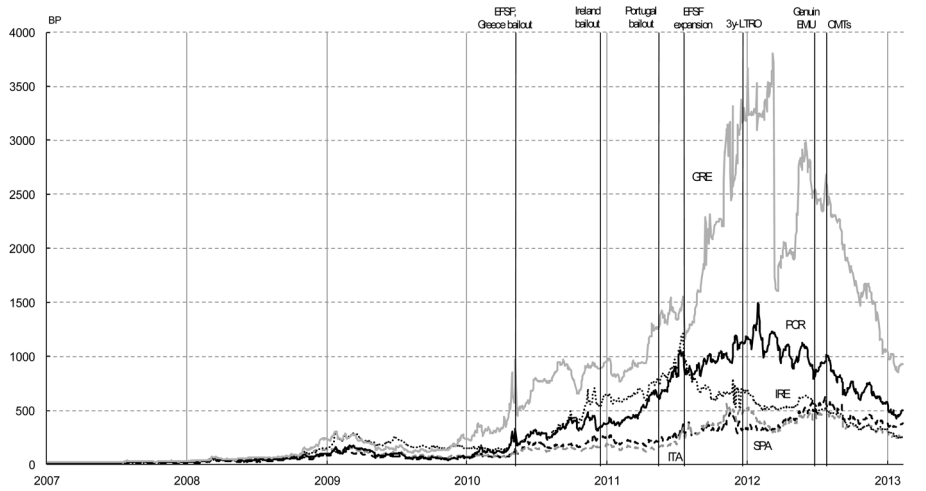
Finally, government guarantees and public capital injections initially acted as powerful shock-absorbers in Europe. But as a result, public finances were closely tied to the situation of banking systems. The Irish government's decision to implement blanket guarantees for most of their bank liabilities offers an extreme example of this connection. Feedback mechanisms between financial and fiscal risks were activated, thus completing a perverse triangle with financial, fiscal and growth risks in its three vortexes. The feedback between growth and fiscal risks (through the role of the so-called automatic stabilisers), along with that between growth and the soundness of banks (more non-performing loans that cause losses and prevent further loans to finance growth), was already well-known.

Of course, dealing with this triangle is a challenge for any country. Three euro area countries, Greece, Ireland and Portugal, had to ask for financial support as their governments lost market access. Within a monetary union and, in particular, within the euro area, the challenge becomes harder as a result of the unique combination of a single monetary policymaker but many little-coordinated national fiscal and financial policymakers. The nature of the problem can be briefly described as follows: any fiscal or financial measure taken at the national level within a financially integrated monetary union is very likely to have strong effects on the rest of the member states. Without a very well-designed framework for such a decision-making process it is very difficult for all the externalities, be they positive or negative, to be properly taken into account at the national level. It is precisely here where the uniqueness of the crisis in the euro area lies: in the absence of well-defined, comprehensive institutional arrangements for economic policymaking in EMU, some saw in the crisis an earthquake with the potential to break up the monetary union. This source of risk is quite idiosyncratic.

Explaining in detail the weaknesses of the framework designed for the euro in 1999, the steps taken to repair the cracks identified and the challenges ahead are the focus of the following sections of this chapter. To motivate them and to conclude this section, Figure 12.7 plots the course of a standard financial tension indicator (the 10-year sovereign yield spread to Germany) around the main events and decisions made in the realm of euro area governance during the crisis. It can be seen that after some of these events the indicator changed significantly. For

example, after the announcement of the OMTs, the indicator fell remarkably for all countries included in the Figure. The reaction of the markets after these events illustrates the important role played by the euro area economic governance during the crisis.

Figure 12.7: 10-year Sovereign Yield Spreads to Germany



12.5. THE MAIN WEAKNESSES OF THE EURO AREA INSTITUTIONAL FRAMEWORK THAT FED THE CRISIS

Unlike monetary policy, the other macroeconomic policies and financial policies continued to be in the hands of national governments. To ensure some minimum degree of convergence between economies, convergence criteria were defined which had to be satisfied by member states before they were admitted to the third stage of monetary union. These included threshold levels for variables such as inflation rates, fiscal deficit, debt levels and interest rates. However, there was no mechanism in place to foster a deeper convergence of the economies after admission.

The Maastricht Treaty (hereafter the Treaty) also included various provisions to ensure some coordination of economic policies. In particular, the Treaty granted power to the European Commission and the Economic and Financial Affairs Council (ECOFIN) to monitor deficit and debt levels and to issue warnings and impose fines if necessary.

Special emphasis was placed on the need to maintain fiscal discipline to avoid spillover effects. The main mechanism to strengthen fiscal discipline was the

Stability and Growth Pact (SGP), introduced in 1997 as a Council regulation. Under the SGP, member states had to fulfill two main criteria: i) an annual fiscal deficit not exceeding 3% of GDP, and ii) government debt not exceeding 60% of GDP, or diminishing and approaching that level. The SGP had two components: a preventive arm and a corrective arm. The preventive arm included two instruments. First, it required countries to achieve medium-term objectives. In particular, countries were urged to achieve a close-to-balance or fiscal surplus position, setting a maximum fiscal deficit of 0.5% of GDP over the cycle. Second, the ECOFIN could issue an early warning to prevent the occurrence of an excessive deficit. To comply with this arm, euro area member states were required to submit annual stability programs to the EC and the ECOFIN, showing how they planned to achieve or safeguard sound fiscal positions to meet the so called medium-term budgetary objectives (MTOs). The EC then assessed these programmes and ECOFIN gave an opinion on them and made recommendations. The corrective arm governed the Excessive Deficit Procedure created by the Treaty. In particular, it specified triggers for this procedure and, if it was decided the deficit was excessive, the ECOFIN issued recommendations to the member state concerned, providing guidance and a timeline to correct it. If the ECOFIN believed that the member state failed to comply with the recommendations, it was allowed to demand a non-interest bearing deposit with the EU or impose a fine on the member state.

But the SGP did not work in practice as a fiscal discipline mechanism. The lack of consensus between the EC and the Council on the need to apply fines to France and Germany in connection with the non-fulfillment of their commitments led to a reform of the SGP in 2005, which basically introduced more flexibility into its implementation. The most important changes included revised medium-term objectives accounting for national differences, as well as clarification of "exceptional and temporary" excesses and "other relevant factors".

This greater flexibility allowed countries to use fiscal policy to counteract the impact of the crisis. As a result, many countries exceeded the reference values for the fiscal deficit and debt, and this did not lead to the fines stipulated in the SGP, rendering this instrument barely effective as a mechanism to strengthen fiscal discipline. For example, Darvas (2010) found that between 2001 and 2006 approximately one-third of euro area member states violated the SGP, and this did not lead to any sanction being levied.

In the area of structural and macroeconomic policies an even more lenient scheme was introduced. The main instrument of coordination was the so-called Broad Economic Policy Guidelines. These established the economic policy priorities for the euro area. The surveillance of fulfillment was based on the exchange of experiences and information between countries, and on peer pressure. But, as noted

by Pisani-Ferry (2010), these guidelines have consistently been ignored by national policymakers and the possibility of issuing a recommendation was used only once, without any effect.

The less rigid scheme in this area reflected the idea that the existence of the monetary union would per se foster a reform process as a consequence of the increase in competition among member states. Also, in contrast to the situation in the area of fiscal policies, the empirical evidence suggested that the spillover effects associated with structural reforms were limited [see, for example Evaert and Schule (2006)].

These coordination schemes in the area of structural and macroeconomic policies were not effective in fostering far-reaching structural reforms and did not prevent the build-up of large macroeconomic imbalances and competitiveness divergences within the euro area.

In the financial sector, policies also continued to be in the hands of national authorities. Although there was some degree of harmonisation of regulation, it was far from sufficient for the needs of a single financial market, as stressed for instance by the so called de Larosière Report (2009). According to that Report, the regulatory framework in Europe lacked cohesiveness as a result of the options provided to EU members in the enforcement of common directives. These options led to a wide diversity of national transpositions related to local traditions, legislation and practices. The Report also stressed that the diversity of regulations complicated the management of crises in the event of cross-border institutions, as the experience with Fortis and Dexia has shown.

The supervision of financial institutions was also in the hands of national authorities, and the institutions in charge of deposit insurance and bank resolution were also nationally based. This contributed to increasing the feedback loops between the sovereign and the banking sector in countries more affected by the crisis, as the deteriorating solvency of the banking sector increased the contingent liabilities of the public sector.

The recent crisis has also shown the lack of adequate macro-prudential supervision, although this weakness was not exclusive to the euro area. In particular, supervision placed too much emphasis on the oversight of individual institutions without taking into account systemic risks. Although some macro-prudential risks were identified by some public institutions such as the ECB and the IMF, there was no mechanism to ensure that this assessment translated into action.

Finally, the euro area lacked crisis-management institutions to stop destabilising market dynamics during stress periods. Although in other monetary unions, such as the United States, there are no crisis-resolution mechanisms for sub-central governments either, there are two important differences between the US and the

euro area. First, national government debt in the euro area is comparatively higher than sub-central government debt in the US. Second, in the euro area a substantial proportion of national government debt is in the hands of national banks. This means that a government default in the euro area could have an additional dimension which is not present in the case of sub-central government debt in the US due to the role played by banks as financial intermediaries.

As De Grauwe (2011) stresses, in a monetary union the ability of countries to stop destabilising market dynamics is limited since the lack of monetary sovereignty means that the national central bank cannot intervene in the markets to counteract speculative attacks against its public debt. In particular, in a member of the euro area the government debt is issued in euro, a currency which is not under the control of national authorities, and markets could potentially provoke a liquidity crisis if they shifted their portfolio to other euro-denominated assets. As De Grauwe argues, an event like this is similar to what happens to emerging economies that finance themselves in foreign currency, which could at some point face sudden stops in external funding that might eventually lead to a liquidity crisis, even in cases in which there are no solvency problems. If not checked, such dynamics could result in self-fulfilling expectations and force a default of the country in question. To prevent this scenario the international financial architecture has provided various instruments in the form of precautionary funding as mechanisms designed to stop financial instability episodes. But in the euro area this type of mechanism did not exist. During the current sovereign debt crisis, markets have identified the existence of this flaw in the institutional architecture of the euro area and various waves of financial instability have occurred in which markets have speculated against the countries perceived as being more vulnerable.

12.6. PROGRESS MADE SO FAR

A special Working Group made up of the finance ministers of EU countries, the EC and the ECB, led by Herman Van Rompuy, president of the European Council, was launched in 2010. Its aim was to propose a reform of economic governance without modifying the key aspects of the Maastricht Treaty in order to avoid an overly long and costly process. The final report of this Group was released in October 2010. Most of its recommendations have already been introduced.

Table 12.1: The Main Changes Introduced in the Stability and Growth Pact (SGP)

PREVENTIVE ARM	CORRECTIVE ARM	ENFORCEMENT STRUCTURE
- Annual growth of public spending should not exceed medium-term GDP growth or should be clearly lower in the medium-term objectives (MTOs) have not been achieved - Public spending growth may exceed medium-term GDP growth in the MTOs have been comfortably achieved or if the surplus spending is offset with discretionary increase in revenue - Possibility of applying sanctions if a country does not achieve the MTOs and there are significant deviations from public spending growth - A more rapid adjustment path is proposed, which has not yet been quantified, for countries with debt of more than 60% or with high risks in terms of debt sustainability	- If the public debt/GDP ratio is higher than 60%, it must decrease - over the course of the three years prior to the assessment - by one-twentieth with respect to the amount by which it differs from the reference value in order to avoid the initiation of an Excessive Deficit Procedure (EDP) - In order to determine whether or not to initiate an EDP, in addition to the numerical benchmark, other important factors will be considered: implicit liabilities related to the level of private debt, the ageing of the population and the net cost of implementing the pension reform	- New political and reputation sanctions - New financial sanctions: non-interest earning deposit amounting to 0.2% of GDP under the corrective arm - Greater automaticity with the intoduction of reverse voting procedures in the decision-making process

In the area of fiscal policy, a reform of the SGP came into force at the end of 2011[8]. Table 12.1 summarises the main changes introduced. The reform establishes new rules and a more effective enforcement with the aim of reinforcing the budgetary discipline of Member States. The new rules give more importance to the debt criterion of the Treaty, which was largely neglected before the reform, in both the preventive arm and the corrective arm. In the latter case, Member States can be subjected to the excessive deficit procedure if the 60% reference level for the debt-to-GDP ratio is exceeded even if their deficit is below 3%. In the preventive arm, a new expenditure benchmark is defined to help assess progress towards MTOs. This new benchmark places a cap on the annual growth of public expenditure, expressed as a medium-term rate of growth. For Member States that have not yet reached their MTO, the rate of growth of expenditure should be below this reference rate in order to ensure adequate progress. To make the enforcement of rules stricter, the so-called reverse qualified majority voting procedure was introduced for the application of sanctions. Under this new procedure, the Council can impose a financial sanction on Member States that do not fulfil their obligations on the basis of a recommendation by the EC, unless a qualified majority of Member States votes against it. Previously, a qualified majority voting system applied, meaning that to impose a sanction a qualified majority of countries had

[8] The new measures, the so-called "Six-Pack", are made of five regulations and one directive proposed by the EC and approved by all 27 Member States and the European Parliament. These measures entered into force on 13 December 2011.

to vote for it. This new system is more automatic and gives more power to the EC. Also, new sanctions have been introduced. In particular, in the preventive arm, an interest bearing deposit of 0.2% of GDP can be imposed. In the corrective arm, a non-interest bearing deposit of 0.2% of GDP can be imposed. Failure to comply with recommendations for corrective actions can result in a fine.

Minimum requirements for national budgetary frameworks were also introduced. These requirements, which cover all administrative levels, establish that fiscal frameworks should be in line with minimum quality standards. National fiscal planning should adopt a pluri-annual perspective, so as to attain the MTOs. Numerical fiscal rules should also promote compliance with the Treaty reference values for deficit and debt.

More recently, the so called fiscal compact, which was included in the Treaty on Stability, Coordination and Governance[9], further strengthened fiscal surveillance. In particular, the threshold for the fiscal deficit included in the definition of the balanced-budget objective to be applied in the MTOs was reduced from 1% to 0.5% of GDP. Also, to reinforce this objective, it requires a rule to be introduced in national legislation that is binding, as a constitutional rule would be. Finally, the fiscal compact further strengthens the role of the EC vis-à-vis the Council, as it states that all EC proposals and recommendations may be considered as automatically applied unless the Council rejects them by qualified majority.

In the area of macroeconomic policy, a new surveillance and enforcement mechanism has been introduced with the aim of preventing and correcting macroeconomic imbalances. The mechanism, called Macroeconomic Imbalance Procedure (MIP)[10], has some similarities with the SGP. Like the SGP, it has a preventive arm and a corrective arm. An early warning system is established based on a scoreboard consisting of a set of indicators covering the major sources of macroeconomic imbalances. For each indicator, alert thresholds have been set to detect potential imbalances. Table 12.2 shows the current set of indicators used and their thresholds. The scoreboard and the thresholds are not applied mechanically. The scoreboard is complemented by an economic reading of indicators, taking into account additional indicators. The aim of the scoreboard is to trigger in-depth analysis in order to determine whether the potential imbalances are problematic or not. The MIP allows the EC and the Council to adopt preventive recommendations at an early stage before imbalances became large. In more serious cases an excessive imbalance procedure (EIP) can be opened for a Member State. In these cases, the Member State concerned will have to submit a corrective

[9] The Treaty on Stability, Coordination and Governance is an inter-governmental treaty, signed by 25 of the 27 EU Member States. In the early 2013, the treaty is in the process of ratification by the national parliaments and may be subject to referendum in some Member States.

[10] The MIP is based on Article 121.6 of the Maastricht Treaty.

action plan with a clear roadmap and timeline for implementing the corrective action. An enforcement regime similar to the one applied to the SGP is introduced for the MIP. In particular, an interest-bearing deposit can be imposed after one failure to comply with the recommended corrective action. After a second compliance failure, this deposit can be converted into a fine of up to 0.1% of GDP. The reverse qualified majority voting system is also applied here. The MIP started to be implemented in 2012. In the first alert mechanism report under the MIP, as of February 2012, 12 Member States warranted in-depth reviews. In the second round, in November 2012, 13 Member States were in this situation.

Table 12.2: Scorecard Indicators in the Macroeconomic Imbalance Procedure (MIP)

VARIABLE	THRESHOLD
3 years backward moving average of the current account balance as percent of GDP	> 6% GDP < -4% GDP
Net international investment position as percent of GDP	< -35% GDP
5 years percentage change of export market shares measured in values	< -6% GDP
3 years percentage change in nominal unit labour cost	> 9% euro-area countries > 12% non-euro-area countries
3 years percentage change of the real effective exchange rates based on HICP/CPI deflactors, relative to 35 other industrial countries	> 5% euro-area countries < -5% euro-area countries > 11% non-euro-area countries < -11% non-euro-area countries
Private sector debt in % of GDP	> 160%
Private sector credit flow in % of GDP	> 15%
Year-on-year changes in house prices relative to a Eurostat consumption deflactor	> 6%
General government sector debt in % of GDP	> 60%
3 year backward moving average of unemployment rate	> 10%
Year-on-year changes in total financial sector liabiliites	> 16.5%

Another new instrument introduced with the aim of coordinating fiscal and structural policies is the so-called European Semester. It is a yearly exercise encompassing all new instruments, including the MIP.

In the financial sector, significant changes have also been introduced over the recent period. In November 2008, the EC mandated a High Level Group chaired by Jacques de Larosière to propose recommendations on how to strengthen the European supervisory and regulatory framework to better equip it to promote financial stability. The final report was presented on February 2009. The propos-

als focused on strengthening cooperation and coordination between national supervisors, including through the creation of new European Supervisory Authorities and a European-level body in charge of macroprudential supervision. Building on these recommendations, a regulatory and supervisory reform has been implemented in recent years. In particular, the new European financial supervisory framework is composed of two new pillars. The first pillar is the European System of Financial Supervisors (ESFS) consisting of a network of national financial supervisors working in tandem with new European supervisory authorities for microprudential supervision purposes (i.e. to safeguard financial soundness at the level of individual financial institutions and protect consumers of financial services). The second pillar is the European Systemic Risk Board (ESRB), a new body whose main task is macroprudential supervision, i.e. monitoring and assessing potential threats to financial stability that arise from developments within the financial system as a whole. To this end, the ESRB can issue warnings and recommendations for action to Member States. This new body addresses one of the weaknesses identified during the crisis, namely the lack of oversight of systemic risks.

More recently, in December 2012, the Council agreed on the main features and the implementation timetable of the so-called Single Supervisory Mechanism (SSM). This new mechanism will be made up of national supervisory authorities and the ECB, which will be in charge of the prudential supervision of all euro area credit institutions whose assets exceed a certain threshold level and also those receiving financial assistance. National supervisors would remain in charge of tasks not conferred on the ECB, for instance in relation to consumer protection, money laundering, payment services, and branches of third-country banks. Non-euro area countries wishing to participate in the SSM will be able to do so by entering into close cooperation arrangements. The EBA (one of the new European supervisory authorities set up in 2011) will be responsible for developing a single rule book and for ensuring the convergence and consistency of supervisory practices among European countries. To comply with the new function and achieve a strict separation between monetary policy tasks and prudential supervision, the ECB will introduce a new supervisory board. Decisions will be deemed approved unless rejected by the Governing Council of the ECB. According to plans, the ECB will start with its new function 12 months after the entry into force of the relevant legislation.

Finally, in the area of crisis resolution, during the euro area sovereign debt crisis the lack of established mechanisms was initially addressed through some temporary arrangements including bilateral lending from euro area partners, in partnership with the IMF, to Greece in May 2010 and the set-up of two temporary financing mechanisms – the European Financial Stability Facility (EFSF) and the European Financial Stability Mechanism (EFSM) – with a combined firepower of

EUR 500 billion. Ireland and Portugal were granted financial assistance from these funds, and also Greece in a second programme, with the IMF co-funding in each case. The scope of these facilities was widened to fund programmes related to the banking sector and to purchase government bonds on the secondary markets. The aim of these programmes was to preserve the financial stability of the EU by providing financial assistance to Member States in difficulty.

In October 2012, a new permanent safety-net mechanism, the so-called European Stability Mechanism (ESM), came into force. Its main features build on the EFSF. The ESM was set up by treaty as an intergovernmental organisation under public international law[11]. It will be the primary support mechanism of the euro area Member States. Unlike the EFSF, which was based upon euro area Member State guarantees, the ESM will have subscribed capital of EUR 700 billion provided by Member States, of which EUR 80 billion will be in the form of paid-in capital and the remaining EUR 620 billion will be callable capital. This capital will provide a lending capacity of EUR 500 billion. Financial assistance programmes to Member States will be funded through the issuance of debt securities on the financial markets. This assistance will be activated upon a request from a Member State to the ESM and will be provided subject to conditionality. The conditionality will be detailed in a Memorandum of Understanding that Member States asking for assistance negotiate with the EC, in liaison with the ECB. The initial instruments available are the same as those available for the EFSF. In particular, the ESM can provide loans to a euro area Member State in financial difficulties, intervene in primary and secondary debt markets, act on the basis of a precautionary programme and provide loans to governments for the purpose of recapitalisation of financial institutions. ESM assistance was first used in the recapitalisation programme of Spanish banks at the end of 2012.

12.7. THE CHALLENGES AHEAD

The intensification of financial market tensions in mid-2012 showed that a key element of the crisis was the feedback loop between sovereign risk and banking risk, along with the increasing fragmentation of financial markets. The reforms in the economic governance of the euro area undertaken up to then were not sufficient to break these feedback effects and the fragmentation trend in financial markets. Against this background, in June 2012 the Heads of State or Government of the participating Member States discussed the report "Towards a genuine economic and monetary union", prepared by the president of the European

[11] The Treaty Establishing the European Stability Mechanism was signed on 2 February 2012. The ESM was inaugurated on 8 October 2012 upon completion of the ratification process by participating euro area Member States.

Council, in cooperation with the presidents of the EC, Eurogroup and the ECB. The report sets out "four essential building blocks" for the future EMU: an integrated financial framework (banking union), an integrated budgetary framework (fiscal union), an integrated economic policy framework (economic union) and strengthened democratic legitimacy and accountability (political union). In that meeting, the president of the European Council was invited to develop a specific and time-bound road map for the achievement of a genuine economic and monetary union.

Among the four areas identified as deserving further integration, banking union was given priority. A banking union has three elements: supervision, a resolution mechanism and a deposit guarantee mechanism. In December 2012, it was agreed to start the implementation of the SSM. The SSM is a major step towards a banking union, but other more fundamental elements such as a single resolution mechanism and a single deposit insurance mechanism are still pending. These two elements are essential for completing the banking union, for breaking the feedback channels between banking and sovereign risks and for fostering financial integration. As regards bank resolution, it is essential that the responsibility is moved to the European level. As stressed by the EC in the report "A blueprint for a deep and genuine economic and monetary union. Launching a European debate", this solution will be more efficient than a network of national resolution authorities, particularly as regards cross-border banking groups, and avoid the negative externalities associated with national decisions. A single deposit insurance mechanism is another important element needed to prevent deposit flight in stress periods.

In the fiscal union realm, discussions are focusing on the need to develop an insurance-type mechanism between euro area countries to buffer country-specific economic shocks. The economic rationale for this type of mechanism is the low labor market mobility in the euro area and the limited role played by the fiscal channel as a risk-sharing mechanism. Different options for a euro area fiscal capacity have been proposed (see, for example, Pisani-Ferry *et al.* (2013)) including unemployment insurance funded by the European budget and a payment system linked to deviations of actual GDP from potential GDP. Another element of the fiscal union would be the issuance of common debt securities. This would resolve the vulnerability of countries that issue securities in a currency not under the control of national authorities during bouts of loss of market confidence. However, the challenge is to design this new instrument in a way that does not weaken incentives to pursue sound fiscal policies as a result of moral hazard.

In relation to economic union, there is a need to put in place a stronger framework for coordination, convergence and enforcement of structural policies. To that end, the EC proposed a framework consisting of two elements: i) a mecha-

nism for systemic ex ante coordination of major reform projects of Member States in the context of the European Semester and ii) a Convergence and Competitiveness Instrument (CCI) in the framework of the MIP based on contractual arrangements between the EC and euro area Member States with the possibility of financial support. This framework should help foster structural reforms needed in the euro area to prevent the emergence of disequilibria and to strengthen adjustment channels. To further foster competition it is also important to make further progress in eliminating existing barriers to trade and to the selling of international services and to achieve a higher degree of tax harmonisation to avoid distortions to business competition.

Finally, the Report prepared by the president of the European Council in June 2012 stresses the need for strengthening democratic legitimacy and accountability. The idea is that the move towards more integrated fiscal and economic decision-making between countries requires strong mechanisms for legitimate and accountable joint decision-making. This would require the involvement of the European Parliament for decisions taken at the European level.

The reforms undertaken so far have tackled some of the weaknesses of the euro area governance, but challenges ahead are enormous (see Table 12.3). In short, the reforms in the economic governance of the euro area imply a significant change in the driving forces operating to achieve an optimum currency area (OCA). The underlying assumption when the euro was launched was that an OCA would result endogenously as a result of competition and the disciplining role played by financial markets. But experience has shown that this assumption was not realistic. Against this background, the current reforms aim at achieving an OCA by introducing externally a more integrated framework in all economic policy areas. This process will require the transfer of sovereignty from the national level to the European level.

12.8. CONCLUDING REMARKS

This chapter has shown that although the current crisis in Europe presents some common features with other financial crises, there are some idiosyncratic factors that have played a crucial role in rendering the crisis deeper and more lasting. In particular, we have stressed that the euro area governance framework did not prevent macroeconomic imbalances from building up in several countries before the crisis and putting their domestic financial systems in a vulnerable position. The high financial integration fostered by the euro amplified the shock propagation and contagion when the crisis erupted and the lack of instruments to deal with domestic crises complicated the resolution against a background in which the ability of countries to combat destabilising market dynamics was limited due

Table 12.3: The Economic Governance of the Euro Area – Main Weaknesses, Progress made so far and Challenges Ahead

WEAKNESSES	PROGRESS MADE	CHALLENGES AHEAD
1 FISCAL POLICIES		
- Budgetary discipline . SGP was not effective enough: - Debt criterium neglected - Weak enforcement	- Reform of SGP - More relevance to debt criterium - Stricter enforcement (qualified majority vote) - *Fiscal compact* - Reduce the threshold for definition of balance budget objetive - Fiscal rule introduced in constitution	
- Heterogeneous national fiscal frameworks	- Minimum requirements for national budget frameworks	
- Lack of mechanism to stabilise asymmetric shocks - Lack of mutualitation of risks		- Fiscal union - European budget - Issuance of euro-bonds
2 MACROECONOMIC AND STRUCTURAL POLICIES		
- Lack of effective co-ordination schemes for structural and macroeconomic policies	- Convergence and Competitiveness Instrument	- Economic Union
- Lack of surveillance and enforcement mechanism for structural and macroeconomic policies	- Macroeconomic Imbalance Procedure (MIP): New surveillance and enforcement mechanism	
3 FINANCIAL POLICIES		
- Lack of complete harmonization of regulation - Insuficient co-operation and co-ordination between national supervisors - Lack of macroprudential oversight	- New supervisory authorities - ESFS - ESRB	
- National supervision - National resolution sheemes - National deposit insurance sheemes	- Single Supervisory Mechanism (SSM)	- Completing banking union - Completing SSM - Single resolution mechanism - Single deposit insurance
4 SAFETY-NET MECHANISM		
- Lack of financial assistance mechanisms	- Creation of the ESM	- Enougn firepower?

to the lack of control over the currency issued by sovereigns. The feedback loops between sovereign risks and banking risks added an extra source of complexity.

The crisis has underscored the need for a deep overhaul of the governance of the euro area. Some promising steps have been taken since the crisis erupted. In a first stage the reforms focused on strengthening budgetary surveillance, introducing a new framework for the surveillance of economic policies and setting up crisis resolution mechanisms. But these reforms were not sufficient to break the feed-back loop between sovereign risk and banking risk and to curb the fragmentation trend in financial markets. Therefore, deeper reforms are needed. Against this background, a second stage of the reform was initiated last year along the lines of the report "Towards a genuine economic and monetary union". In particular, the report proposes a move to an integrated framework in four areas: banking, economic policy, fiscal policy and democratic legitimacy and accountability. The

area of banking was given priority and the first steps to implement a single supervisory mechanism have already been initiated. This is a major achievement, but full banking union also requires single bank resolution and deposit insurance mechanisms. Progress in the other three areas identified in the report is also pending. Hence the reform is far from having been completed.

Once the reform is completed the euro area will be better equipped with mechanisms to prevent the build-up of imbalances in particular Member States and reduce their vulnerability to external shocks, and will have more efficient instruments to manage financial crises. In the meantime, a number of "legacy problems" will also have to be dealt with. The challenges ahead are enormous, but this is the only way if we Europeans want the next time to actually be different.

REFERENCES

AYUSO, J. and MALO DE MOLINA, J.L., 2011, *El papel de los bancos centrales durante la crisis financiera: Lecciones para el futuro*, Fundación de Estudios Financieros, Papeles de la Fundación, number 42.

BERNANKE, B., 2005, "The Global Saving Glut and the US Current Account Deficit", *Sandridge Lecture*, Virginia Association of Economists, Richmond, Virginia. April, 14.

BORIO, C., 2003, "Towards a Macroprudential Framework for Financial Supervision and Regulation", *CESifo Economic Studies*, Vol. 49, No. 2.

BRUNNERMEIER, M., 2009, "Deciphering the Liquidity and Credit Crunch 2007-2008", *Journal of Economic Perspectives*, Vol. 23, No. 1, pp. 77-100.

CLAESSENS, S. and KOSE, M.A., 2013, "Financial Crises: Explanations, Types, and Implications", *IMF Working Paper* 13/28.

CLAESSENS, S., KOSE, M.A. and TERRONES, M.E., 2013, "The Recent Global Financial Crisis: How similar? How Different? How Costly?" in S. CLAESSENS, M.A. KOSE, L. LAEVEN and F. VALENCIA (Eds.), *Financial Crises, Consequences, and Policy Responses*, forthcoming, IMF.

DARVAS, Z., 2010, "The case for reforming euro area entry criteria", *Society and Economy* 32 (2): 195-219.

DEGRAUWE, P., 2011, "The governance of a fragile eurozone", *CEPS Working Document* 346.

DE LAROSIÈRE REPORT, 2009, *The high-level group of financial supervision in the EU*.

ECB, 2007, *Financial Stability Review*, June.

ECB, 2007, *Financial Integration in Europe*, March.

ECB, 2011, "The ECB's non-standard measures – Impact and phasing-out", *Monthly Bulletin*, July.

ECB, 2013, *Financial Integration in Europe*, April.

EVERAERT, L. and SCHULE, W., 2006, "Structural reforms in the euro area: economic impact and the role of synchronizations across markets and countries", *IMF working Paper* 06/137.

FRAME, S., LEHNERT, A. and PRESCOTT, N., 2008, *A Snapshot of Mortgage Conditions with an Emphasis on Subprime Mortgage Performance*, US Federal Reserve System.

HAU, H., LANGFIELD, S. and MARQUES-IBANEZ, D., 2012, "Bank ratings: what determines their quality?", *ECB Working Paper Series*, No. 1484.

IMF, 2007, *Global Financial Stability Report*, April 2007.

IMF, 2012, *Global Financial Stability Report*, October 2012.

KAMINSKY, G. and REINHART, C., 1999, "The Twin Crises: The Causes of Banking and Balance-of-Payments Problems", *American Economic Review*, Vol. 89, pp. 473-500.

KASHYAP, A., RAJAN, R. and STEIN J., 2009, "The Global Roots of the Current Financial Crisis and its Implications for Regulation" in *The Euro at Ten*, ECB.

KALEMLI-OZCAN, S., MANGANELLI, S., PAPAIOANNOU, E. and PEYDRÓ, J.L., 2009, "Financial Integration, Macroeconomic Volatility and Risk Sharing – The Role of the Monetary Union", in *The Euro at Ten*, ECB.

KINDLEBERGER, C., 1978, *Manias, Panics, and Crashes: A History of Financial Crises*, New York: Basic Books.

LAEVEN, L. and VALENCIA, F., 2012, "Systemic Banking Crises Database: An Update", *IMF Working Paper* 12/163.

LANE, P., 2009, "EMU and Financial Integration" in *The Euro at Ten*, ECB.

MINSKY, H.P., 1975, *John Maynard Keynes*, Columbia University Press.

MUNDELL, R.A., 1961, "A Theory of Optimum Currency Areas", *The American Economic Review*, Vol. 51, No. 4, pp. 657-665.

NICKELL, P., PERRAUDIN, W. and VAROTTO, S., 2000, "Stability of rating transitions", *Journal of Banking & Finance*, 24, pp. 203-227.

PISANI-FERRY, J., 2010, *Euro-area governance: what went wrong? How to repair it?*, Bruegel Policy Contribution, June.

PISANI-FERRY, J., VIHRIALA, E. and WOLF, G., 2013, *Options for a euro area fiscal capacity*, Brugel Policy contribution 2013/1.

REINHART, C. and ROGOFF, K., 2009, *This time is different: Eight Centuries of Financial Folly*, Princeton Press.

REINHART, C. and ROGOFF, K., 2011, "From Financial Crash to Debt Crisis", *American Economic Review*, Vol. 101, pp. 1679-1706.

SHILLER, R.J., 2000, *Irrational Exuberance*, Princeton University Press, Princeton & Oxford.

VENTURA, J., 2009, "Panel Statement at the Conference", *The Euro at Ten*", ECB.

ZINGALES, L., 2008, "Causes and Effects of the Lehman Brothers Bankruptcy", *Testimony before the Committee on Oversight and Government Reform*, United States House of Representatives.

13. The Effects of Derivatives on Underlying Financial Markets: Equity Options, Commodity Futures and Credit Default Swaps

William Arrata, Alejandro Bernales and Virginie Coudert

13.1. Introduction

Financial innovations deeply affect the behavior of investors in all financial markets worldwide. As a result, investors appear to be constantly adapting to new financial products, practices, and institutional arrangements. Indeed, most market participants have to engage in a painstaking and costly cognitive process aimed at learning the implications and benefits of new financial instruments. Many financial innovations have been related to the development of derivatives for the last decades.

In this chapter we focus on three main categories of derivatives: equity options, commodity futures, and credit default swaps (CDS). These three types of derivatives have expanded rapidly over the last decades. The option markets have been growing since 1973, as soon as Black and Scholes found a straightforward formula to price them. Commodity futures have also happened to soar since 1973, as the oil crisis introduced a sudden instability in a previously tranquil market; they have surged again since the start of 2000s, when exchange traded funds began to invest in commodity-index based instruments. As well, the credit derivatives have been developing since the beginning of the 2000s in line with the securitization of banks' loans.

All these derivative instruments share common features that raise important issues for financial stability. First, although they were initially designed for protecting investors against losses that may result from adverse market price fluctuations on the underlying market, be it an equity, a commodity, or a bond, derivatives are also widely used by speculators. Consequently, protection for hedgers also goes with more risk-taking by speculators. Second, trading is often more intensive on the derivatives markets than on the spot markets. As a result, derivative markets may have taken the lead over their underlying market in the price discovery process. Although the evidence is mixed, the question is raised by a number of studies, especially for commodities and corporate CDS. Consequently, evolutions on these derivative markets have important implications for financial stability as well as for the real economy.

13.2. EQUITY OPTIONS AND THE EFFECTS ON MARKET QUALITY AND INFORMATIONAL EFFICIENCY

Equity option listings are common financial innovations (in the sense that they can be observed multiple times per year) in which completely new option contracts are introduced onto the market for the first time by option exchanges. For instance, the number of stocks with option contracts has grown on average 20% per year between 1973 and 2009 in the United States alone. In 2009 over 3,366 million contracts were traded on more than 3,500 stocks, in contrast to the 911 contracts that were traded on 16 underlying stocks on the first day of trading on the Chicago Board Option Exchange in April 1973[1].

Currently, there are several empirical studies that examine the consequences of the development of equity options. The rising importance of option markets in modern economies, as well as the rapid rate of innovation in that sector, has generated interest among academics, practitioners and regulators. The first step in understanding the effects of equity options on financial markets is to answer the following questions:

i. how is the *ex-ante* selection process from option exchanges to choose a stock which will be used as underlying for option contracts?; and
ii. which are the factors that affect the *ex-post* adoption process among the investors?

In relation to the *ex-ante* stock selection process, Mayhew and Mihov (2004) and Danielsen *et al.* (2007) find that stock volume and volatility are the most important factors that may lead a stock to be selected as an "optionable" one, i.e., a stock on which derivatives may be written. Option exchanges are member-owned organizations in which listing decisions are made by the members whose profits are an increasing function of the trading activity. Thus, anticipating a strong option trading in the newly listed options plays a key role in the option exchanges' choice of which options to introduce.

Firstly, option exchanges select equities to introduce new option contracts using the stock volume, because volume will simply migrate from the spot to the derivatives market when investors view option contracts as substitute for taking directional positions in the underlying stock, as in Easley *et al.* (1998b). Volume will spill over in a positive-sum-game from the stock market to the option market when additional demand for options trading is generated by investors who own the underlying asset and wish to write covered calls or buy protective puts (see, e.g., Kaul *et al.* (2004)). Secondly, option exchanges also select stock with high volatility since it implies that new information hits financial markets at a faster

[1] Section 13.2. is based on the paper Bernales and Guidolin (2013).

rate thus creating a higher potential for divergence of opinions among agents and for hedging by investors holding long-term positions. Moreover, as emphasized by Mayhew and Mihov (2004), newly opened option markets also serve as venues for trading between investors with differences in volatility beliefs.

Regarding the ex-post adoption process, despite the enormous expansion observed in option markets, it is also true that new equity options listed by option exchanges have presented diverse adoption levels among investors. Moreover, some of the options introduced have disappeared in a de-listing process due to low demand for these securities. For instance, 20% of all the equity option listings between 1996 and 2009 in the United States were de-listed in the two years following their introduction dates[2]. In fact, option listings offer an excellent opportunity to study the adoption process of security innovations since the number of option contracts traded is endogenously determined by investors. In an equity option listing a set of standardized and brand new (i.e. never traded before) option contracts with the same underlying stock are introduced and allowed to be traded in an option exchange. However, for each option contract there is no initial 'established number' of contracts that should be traded in the exchange, which is contrary to other financial offerings where the number of assets is determined exogenously by an institution (e.g., a company decides the number of stocks or corporate bonds to be issued). Instead, in option markets investors themselves create the contracts in an endogenous process based on their demands and following the characteristics of the standardized contracts that offer the option exchange. For instance, an investor has to buy a call option contract while another one has to sell it in order to create that call option contract, which is coordinated by an option market maker[3].

Recently, Bernales and Guidolin (2013) show that options exchanges appropriately select stocks with high stock volume and liquidity as was reported by Mayhew and Mihov (2004) and Danielsen *et al.* (2007). Nevertheless, Bernales and Guidolin (2013) also find evidence that high levels of asymmetric information also predict the ex-post option adoption. For instance, Table 13.1 (which was taken from Bernales and Guidolin (2013)) presents a positive and significant relationship between different measures of asymmetric information in the year prior to the listing date (Columns 1 and 3) and option adoption levels measures by the option dollar-volume after the option listing. In addition, the results presented in Table 13.1 (columns 4 to 7) show that the levels of option adoption are positively and significantly related to the prior stock volume and volatility, which is consistent with the 'ex-ante' selection policy by option exchanges of introduc-

[2] Information obtained from the Option Clearing Corporation.
[3] For a global view of option listings, see Mayhew and Mihov (2004), and for an understanding of the current option market structure see Battalio *et al.* (2004).

ing option contracts based on stocks with high stock volume and volatility, as mentioned above.

The intuition behind the relationship between option adoption and asymmetric information is that heterogeneous levels of information also generate differences of opinions among investors. On the one hand, the general public of investors may wish to hedge the adverse effects of informed trading on their equity positions by trading options written on the stock. In this case, options markets will be perceived as venues in which uninformed investors try to shield themselves from the existence of informed investors. On the other hand, informed investors may be eager for options markets to be created on the stocks for which they have access to superior information: options offer cheap ways in which private information may effectively be turned into profits. In fact, the literature (see e.g., Anand and Chakravarty (2007); De Jong *et al.* (2006), and references therein) tells us that there is strong empirical evidence of informed investors adopting fragmented trading strategies within option markets to try and maximize the trading profits from their private information. Thus, option listings enjoy higher chances of ex-post realized success when the listings concern underlying stocks that are characterized by pervasive information asymmetries. This is also consistent with the theoretical literature (see e.g., Brennan and Cao (1996); Vanden (2008)) that has emphasized how information asymmetries will normally increase both the demand and the traded volume of option-like derivatives.

Table 13.1: Regression Analysis of the Impact of Different Factors on Ex-Post Option Adoption Rates[a]

PIN_{0Y}	$AdjPIN_{0Y}$	$InvAnlst_{0Y}$	$Ln\,(DVlm_{S,252,0Y})$	$\frac{DVlm_{S,21,0Y}}{DVlm_{S,252,0Y}}$	$SDev_{S,252,0Y}$	$\frac{SDev_{S,21,0Y}}{SDev_{S,252,0Y}}$	$Ln\,(Size_{0Y})$	Const.	Obs.	R^2
Dependent Variable $Ln\,(DVlm_{OP,1Y})$										
0.45			0.91	0.40	1.29	-0.26	-0.22	-9.28	891	0.41
(2.02)**			(11.73)***	(10.76)***	(3.91)***	(0.97)	(1.03)	(9.83)***		
	0.49		0.83	0.41	1.18	-0.31	-0.15	-10.24	891	0.43
	(2.72)***		(11.83)***	(11.23)***	(3.16)***	(2.78)	(0.77)	(11.31)***		
		0.83	1.04	0.48	0.71	-0.46	-0.08	-11.51	891	0.48
		(3.16)***	(12.16)***	(11.02)***	(3.63)***	(1.81)*	(0.85)	(11.20)***		

a. This table is taken from Bernales and Guidolin (2013). The table reports regressions of a measure of success of new and recently listed stock options on a range of explanatory factors. The dependent variable is the averages of the daily option dollar-volume in the first year after the option listing ($DVlm_{OP,1Y}$). From the independent variables side, PIN_{0Y} is the probability of informed trading in the year prior to the option listing date (Easley *et al.* (1996)), which has been widely used in the literature as measure of asymmetric information. $AdjPIN_{0Y}$ is the adjusted probability of informed trading in the year prior to the option listing date, an alternative measure of informed trading proposed by Duarte and Young (2009) to correct the fact that the standard PIN may often capture spurious liquidity effects. $InvAnlst_{1Y}$ is the inverse of the average of the number of analysts also in the year prior to the option listing date. The use of the number of analysts is however also supported by Easley *et al.* (1998a) who state that: "(...) high analysts stocks face a lower probability of information-based trading (...)" (p. 200). The other independent variables used are: underlying stock volume, distinguishing between long-term ($DVlm_{S,252,0Y}$) and a short-term ($DVlm_{S,21,0Y}$) components, which are calculated as the average daily stock dollar-volume using the 252 and 21 trading days preceding the listing date, respectively; the underlying stock return volatility, distinguishing between long-term ($SDev_{S,252,0Y}$) and short-term ($SDev_{S,21,0Y}$) components, calculated as the annualized standard deviation of daily log returns over the 252 and 21 trading days preceding the listing date, respectively; and distinguishing between stock market capitalization ($Size_{0Y}$) calculated with reference to the year to listing. ***, **, and * denote significance at 1%, 5%, and 10%, respectively (*t*-statistics are in parentheses).

Once new option contracts are listed and traded by market participants, this new market affects importantly the underlying asset market from different edges. For instance, the finance literature has emphasized that derivatives improve market efficiency by lowering transaction costs (e.g., Merton (1998)) and by reducing the overall level of aggregate, systemic risk (e.g., Darby (1994)). Furthermore, there is evidence that equity options improve information flows (e.g., Cao (1999); De Jong *et al.* (2006); Kumar *et al.* (1998))[4]. For instance, option listings generate incentives for an increase in the number of market analysts since multiple option contracts on the same underlying asset are introduced simultaneously, and thus investors are willing to pay for additional information about the underlying asset's properties and payoffs (e.g., Cao (1999) and Massa (2002)). Therefore, option listing should induce an increase in the number of market analysts (e.g., Skinner (1990)), which should induce improvements in the quality of informational flows. For example, Figure 13.1 shows the evolution of the average number of analysts in the year prior to the listing date and for the following year, where the month zero is the month in which option contracts were introduced. In Figure 13.1, 12 months before the listing date, the number of analysts for optioned securities is on average 3.6; while that 12 months after option listings, the average number of analysts is 7.1 (an increase of 197%).

Equity options also induce a reduction in the asymmetric information through a learning process based on the private information revealed in the new option market. The learning explanations for the asymmetric information reductions involve two main informational origins. First, option trades (which provide an additional source of private trading information since two markets are now available) should accelerate the rate of disclosure of information from informed investors as result of the new observable market activity (e.g., Jennings and Starks (1986) and Diamond and Verrecchia (1987))[5]. Second, the increasing tendency in the number of analysts (as shown in Figure 13.1) is also fundamental for changes in the levels of asymmetric information, since more skilled and specialized people facilitate the detection of private information disclosed in trades of informed agents[6]. In fact, recently Bernales and Guidolin (2013) show that equity options reduce standard measures of information asymmetry as used in the microstructure literature. For instance, Table 13.2 shows that the asymmetric information of stocks is reduced once option contracts are listed. Out of a sample of 891 pairs

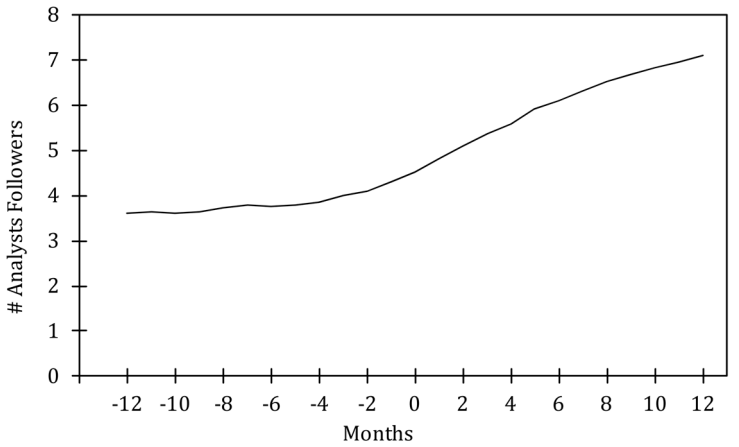
[4] Empirical evidence shows that the U.S. national system of options exchanges has become progressively more informationally efficient and better integrated with the underlying spot equity markets (see e.g., Battalio *et al.*, 2004).

[5] This is also supported by Kumar *et al.* (1998) and De Jong *et al.* (2006), who show that option listings are related to improvements in the market quality of the underlying asset.

[6] The main cognitive mechanism followed by uninformed investors is a learning-by-observing process which assumes that agents do not live in an isolated environment; and for that reason their surroundings should be a source of knowledge as well (e.g., Bikhchandani *et al.* (1998) and DeLong and DeYoung (2007)). Therefore, after an option listing uninformed investors might use the new information disclosed by informed agents in the option market activity to acquire this knowledge, and thus to make trading decision.

of matched levels of asymmetric information (before and after option listings) of equity option listings, 558 have smaller levels of asymmetric information after listings than in the year prior to the option introductions. Consequently, option trading is expected to improve the informational efficiency of the security market as a whole, in the sense that option trades contribute to reveal private information and improve flows of information (e.g., Chern *et al.* (2008); De Jong *et al.* (2006); Kumar *et al.* (1998); Senchack and Starks (1993)).

Figure 13.1: Evolution of the number of analysts before and after the option listing[a]



a. This plot is based on the same data-sample used in Bernales and Guidolin (2013). This figure present the evolution of the average of the number of analysts making annual earnings forecasts for the company that issued stock that was selected by option exchanges to list option contracts. The data was obtained from the I/B/E/S database. We present the evolution of the cross-sectional monthly average of the number of analyst followers in the year prior to the listing month (month zero) and for the following year.

Table 13.2: Reduction in Asymmetric Information after Option Listings[a]

Differences in *Adj PIN* between the Year Prior to and the Year Following Option Listings Using Multiple Sub-Samples						
	Obs.	#($AdjPIN_{0Y} > AdjPIN_{1Y}$)	%($AdjPIN_{0Y} > AdjPIN_{1Y}$)	Median $AdjPIN_{0Y}$	Median $AdjPIN_{1Y}$	Median % Change ($AdjPIN_{1Y}/AdjPIN_{0Y}$ - 1)
	Complete Sample					
AdjPIN	891	558	62.63%	0.16	0.13	-19.96%[aaa,bbb]

a. This table is taken from Bernales and Guidolin (2013). The table presents a matched sample analysis of the effects of option listings on changes in the asymmetric information using the *AdjPIN* measure defined in Table 13.1. The matched pairs contain *AdjPIN* estimates from the year before and the year after option listings. The table reports results for both the paired-sample sign test and the Wilcoxon signed-rank test applied to the change from $AdjPIN_{0Y}$ to $AdjPIN_{1Y}$. The null hypothesis of no change in *AdjPIN* is tested against the one-sided alternative of $AdjPIN_{1Y}$ being inferior to $AdjPIN_{0Y}$. [aaa], [aa], and [a] denote significance at 1%, 5%, and 10%, respectively, for the paired-sample sign test. [bbb], [bb], and [b] indicate significance at 1%, 5%, and 10%, respectively, for the Wilcoxon signed-rank test.

Additionally, the literature has long debated whether option listings ought to affect the liquidity and volatility of the underlying stock market., Branch and Finnerty (1981), Conrad (1989), Damodaran and Lim (1991), Skinner (1989),

and Sorescu (2000) have tested whether option listings influence stock volatility but also warned that if exchanges list options in response to or in anticipation of changing volatility, selection bias may introduce a spurious relation between listings and volatility. Using a control-sample design that allays the endogeneity concerns, Mayhew and Mihov (2004) report that optioned stocks tend to experience a larger volatility increase, or a smaller decrease, than options in their control sample; however their result remains mixed. Interestingly, similar ambiguous theoretical (see Cao (1999); Massa (2003)) and empirical (see e.g., Damodaran and Lim (1991); Skinner (1989)) findings concern the effects of option introductions on the volume of the underlying stock, because in a few cross-sectional studies it has been reported that the increase in volume may disappear after controlling for aggregate market volume.

Although empirical studies have confirmed weak results concerning the impact of listings on volumes and volatility of the underlying stocks in option data, the causal link that this section wants to emphasize has, after all, a "happy ending", if we assume that the goal of capital market is to improve the market efficiency. As we mentioned previously, there is evidence that the more successfully adopted equity option listings are the ones in which the underlying stock has high levels asymmetric information. However, equity options reduce the original levels of asymmetric information, in the sense that in the underlying stock market there are less information-driven trades. Even more, there is also evidence that equity options improve the market efficiency by decreasing transaction costs and market risks. These links of the chain have a classical Grossman and Stiglitz's (1980) flavor: informed traders are rewarded for their activity of acquiring information and taking it to the market; as they perform this role, they cause their privileged information to depreciate and to be incorporated into prices. The only, to us rather major, difference in the story – as a result of this virtuous mechanism – in the end the financial system finds itself enriched of a new and useful conduit for these information flows, the newly created option market.

13.3. COMMODITY FUTURES

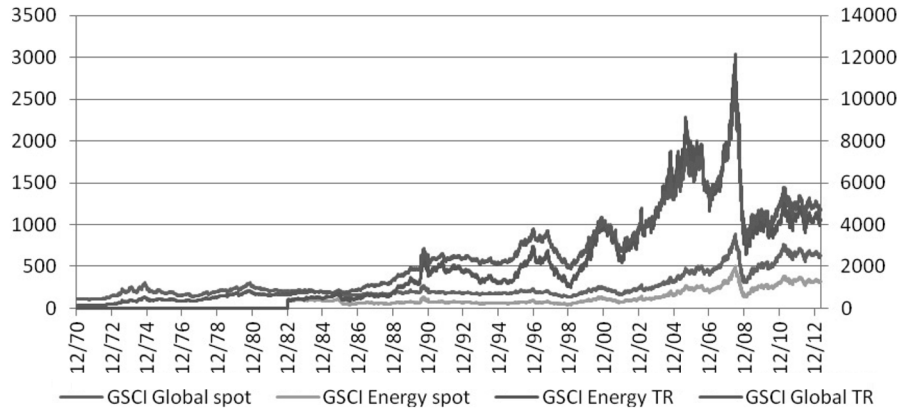
Commodity derivative markets have approximately followed the same pattern as equity derivatives as concerns their sudden expansion during the seventies. This may seem puzzling considering the fact that this kind of instruments has been used since the dawn of history, as attested by a great number of tablets found in Mesopotamia and that commodity futures have been traded in Chicago since the nineteenth century. However, in the aftermath of World War II, the restrictions of capital movements imposed by the Bretton Woods system as well as the financial

stability experienced during this era did not foster the development of derivative markets, commodity futures or others.

The market was first revived when the convertibility of the USD to gold collapsed in 1971, which encouraged the trading of gold derivatives. Then the oil crisis in 1973 which drastically raised the volatility in previously stable oil prices, boosted oil derivatives, as agents became more inclined to hedge against adverse price movements.

In the 2000s, as the commodity prices surged again after two decades of relative decline, commodity derivative markets experienced a huge expansion. As a matter of fact, the development of commodity derivatives is in line with these price hikes and volatility peaks (Figure 13.2). The causality can be both ways. The more volatile the prices, the greater incentives are for agents to hedge as well as to speculate. On the other hand, it can be argued that more developed derivative markets may have a part in the surge of commodity prices and the higher volatility in the 2000s.

Figure 13.2: SPGSCI Commodity index, spot and future total returns



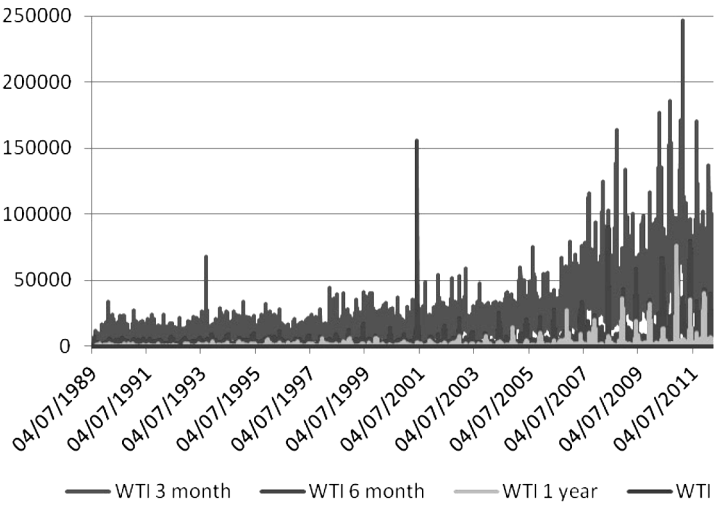
Source: Bloomberg.

13.3.1. The Rise in Commodity Derivatives in the 2000s

The volume of derivative market transactions on OTC and organized markets largely exceeds that of physical market transactions (Domanski and Heath (2007)). For example, on the oil market, the number of derivative transactions represents 35 times the transactions traded in the physical market (Chevalier (2010)). Contracts on the WTI (West Texas Intermediate) used as a benchmark for oil pricing surged in the 2000s, especially on the 3-month maturity (Figure 13.3).

Transactions on indices and/or exchange traded funds (ETFs) of commodities also posted a spectacular development. The main commodity indexes are the Standard & Poor's and Goldman Sachs Commodity Index, (SPGSCI) and the Dow-Jones-UBS (DJ-UBS). Both include a large share of energy among the retained commodities. Between 2003 and March 2008 the volume of transactions on commodity-index based instruments acquired by institutional investors rose from USD 13 billion to USD 260 billion (Master (2008)). Numerous other studies point to this rapid development (Petzel (2009); Mayer (2009), Tang and Xiong (2010)).

Figure 13.3: Number of contracts on the WTI



Financial operators, banks, hedge funds and specialized traders, have been increasingly active in these markets. There are basically two types of players in this domain: (i) 'index traders' who systematically take long positions on forward markets and roll them over before the delivery date, and (ii) the 'money managers', like hedge funds, which have a more active management since they conduct arbitrage from both sides of the market, often following the trends (Greely and Currie (2008); Currie *et al.* (2010); Mayer (2009)). Indeed, commodity futures are attractive for investors as they generate higher yields than the risk-free rate with little or no correlation to the yields from other asset classes and their performance cannot be replicated by any combination of other assets (Mongars and Marchal-Dombrat (2006)).

13.3.2. The Reasons behind the Market Expansion

Investing in commodity futures is less profitable in the long-run than equity indices, although the volatility of returns is approximately similar on the two types of assets. As a matter of fact, passive allocations in individual commodities do not generate much alpha on average, but a tactically weighted portfolio can produce returns similar to equities (Erb and Harvey (2006)). The returns can also be improved by selecting commodities based on their inventory levels (Gorton *et al.* (2007)). On the whole, the main reasons to invest in commodity futures are not high profitability or small volatility. The rationales behind investing in commodity derivatives are: first that they offer a protection against inflation and second that they provide a portfolio diversification.

First, commodity futures are supposed to provide protection against inflation in the long term (Bodie and Rosansky (1980)). Taylor (1998) finds a similar result for precious metals as do McCown and Zimmerman (2007) although the degree of protection varies from one period to another. As commodities offer a certain level of protection against inflation, they are sought by long-term investors whose charges are indexed to inflation (pension funds, endowments, etc.). Nijman and Swinkels (2003) show that the addition of commodities to their portfolio improves the strategic allocation for pension funds with inflation-indexed liabilities. This is not necessarily the case for pension funds with nominal liabilities, except under certain macro-economic conditions. Kat and Oomen (2006) also find that the returns on commodities futures are positively correlated with unexpected inflation. However, their protective capacity is variable from one commodity to another.

Second, the other major advantage of commodities is to diversify portfolio risk thanks to their relatively low correlation with equities and bonds (Bodie and Rozantsky (1980)). In addition, Gorton and Rouwenhorst (2006) have shown that the SPGSCI index has an average positive return during periods of entry into recession, just when equity prices are falling. The negative correlation with equities during these periods is an incentive to include commodities in an equity portfolio. Coudert and Raymond (2012) also find this property for gold futures, which may be seen as safe haven to protect investors against their losses on equities during bear markets and recessions. More generally, commodity futures are not correlated to equities and bonds, although the correlations vary depending on the phases of the business cycle according to Kat and Oomen (2006). A de-correlation with equities is also shown in the case of oil (Geman and Kharoubi (2008)).

For Silvennoinen and Thorp (2010), the diversification property of commodities futures may fade away with the massive arrival of financial actors on the

commodity markets. According to these authors, correlations have increased between commodities and financial assets (equity indices in different countries and US bonds) since the late nineties. However, this result is controversial. For other authors, financialization of the commodity market in the 2000s has not brought about an increase in the correlation between commodities and equities (Buyuksahin and Robe (2010)), which is evidenced by the dynamic correlations between the yields from commodities index – the Goldman Sachs Commodities Index (GSCI) and those from US equity indices (the S&P 500). Buyuksahin *et al.* (2009) also show that this rise in the correlations is not a trend, as it only occurred during the crisis in 2008.

In addition to the diversification provided by commodities relatively to bonds and stocks, another source of interesting diversification relies inside the commodities themselves. In this matter, most studies point to a rise of the correlations between the prices of different commodities over the past decades. In their 1980 study, Bodie and Rosansky did not find any significant correlation between the future prices of the 23 commodities in their sample. In contrast, for Pindyck and Rotenberg (1990), the correlations between different commodities are very strong. These high correlations cannot be explained by common macroeconomic factors, but are attributed to the herd mentality of financial operators. For Kat and Oomen (2006), the correlations are very high indeed within each category of commodity, but low between the categories. More recent studies show that there may well be an increase in the correlations between commodities, particularly between oil and agricultural raw materials. Casassus *et al.* (2009) also observe an increase in the correlations between commodities, but consider this phenomenon to be caused by common economic factors.

An interesting hypothesis is that these rising correlations between the prices of different commodities is due to the massive investments in commodity indexes. This hypothesis stated by Tang and Xiong (2010) is comforted by their empirical observations. According to their results, the correlations between the commodities belonging to the major indices (SPGSCI and DJ-UBS) are substantially stronger than for the other commodities not included in the indices.

13.3.3. Speculators, Hedgers and the Difference between Spot and forward Price

For Keynes (1930), risk-averse commodity producers seek protection from price contractions by selling on the futures markets. In so doing, they exert a downward pressure on the futures prices compared with the spot price. This leads to a lower futures price than the expected spot price, a situation described as 'normal backwardation'. Speculators, by acquiring these assets at lower forward prices,

benefit by extracting a risk premium. By extension, a 'backwardation' situation is defined as a future price below the spot price, a scenario that is often observed on commodity markets. Working (1949) considers that the spreads between future prices and spot prices depend above all on inventory levels. The 'backwardation' situation characterizes a market in which available stocks are low; but the situation can reverse (into a "contango") if stocks are high. Hence future prices and spot prices are linked by a trade-off relationship that depends on stock levels. This stock-based hypothesis is still the dominant theory (*cf.* notably Fama and French 1987; Gorton *et al.* (2007); Geman and Ohanna (2009)).

Speculation may be considered excessive when it exceeds hedging requirements (Working (1949)). Excessive speculation can be measured by the ratio between the observed speculation on the market and the requirements for hedging protection, which is called Working's T-index. Since a certain level of speculation is necessary for market liquidity, the preferred ratio is slightly higher than 1. CFTC data, which distinguishes between commercial agents and non-commercial agents, allows the calculation of this index. By analyzing these data, Till (2009) concludes that speculation was not excessive on oil derivatives market (futures and options) from June 2006 to October 2009, compared to historical benchmarks. Irwin and Sanders (2010) consider 12 main agricultural commodities markets for the period June 2006 to December 2009 and find that a majority of them had a T-index under 1.15 on average over this period.

Acharya *et al.* (2010) show with a theoretical model that the risk-averse producers may be forced to pay more for their hedges if speculators are capital constrained. When speculative activity contracts, the risk premium associated with a hedge increases. This result is confirmed by an empirical analysis. The influence of futures markets on spot prices results from the fact that these futures markets allow producers to adjust their inventories to demand shocks. The consequences of the limits of arbitrage are also analyzed by Etula (2009). As the OTC market is very large, the capacity of broker-dealers to carry the market risk is a key factor in hedging costs. In a theoretical model, Etula (2009) shows that the risk premium decreases with the leverage of brokers and dealers. He also provides some empirical evidence to support this relation.

Sanders *et al.* (2008) show that in the domain of agricultural products, the arrival of new players on the market via index trading has been balanced by the simultaneous arrival of new sellers. This suggests that index management is beneficial to a market whose hedging requirements are traditionally governed by sellers. Chinn and Coibon (2010) show that future prices are unbiased predictors of spot prices in the energy market. This is not the case with other commodities, particularly those with low levels of market liquidity. However, as transaction volumes have grown, future prices have become more reliable predictors of spot prices in recent years.

13.3.4. Two Opposite Views on the Consequences of Derivatives Expansion on Commodity Prices

As the prices of commodities surged in the 2000s, especially from 2006 to 2008, a number of observers have argued that the *financialisation* of the commodity markets through derivatives trading was at the root of these anomalies. However, this view is far from being unanimous and is still debated in the literature (Arrata and Coudert (2011a)). Let us review their arguments of the two sides.

On the one hand, financialisation was responsible for the surge in commodity prices in 2006-2008 according to Masters (2008)' testimony before the US Senate. The considerable flows channeled by index funds increased demand and pushed up prices. He bases his view on the simultaneous rise in the purchases by index traders and in the price of commodities since 2000. The US Senate (US Senate Permanent Subcommittee on Investigations (2009)) takes up this argument and deems that the surge in wheat futures prices is due to index funds. In his testimony before the CFTC, Petzel (2009) also considers that the long positions taken by index funds increase demand in derivatives markets. Even if buyers find speculators to be short-term counterparties to sell to them, if the long position is held for a long time, at some point it will probably find a commercial counterparty. This counterparty will deliver at maturity or will roll its position forward if storing the commodity is more profitable. Thus, index funds' entry into the market has led to rising spot prices combined with the build-up of inventories by futures sellers. However, Petzel warns the CFTC against banning financial investors' access to futures. Such a ban would prompt them to operate directly in the physical market, with even more serious consequences for final consumers given the lack of experience of these players in the management of inventories. In his report for the CFTC, Mayer (2009) likewise concludes that index trader positions were at the root of the 2006-2008 price rises. Using Granger causality tests, he shows that index trader positions "cause" price fluctuations, particularly for agricultural products. In their study, Caballero *et al.* (2008) link the surge in oil prices in 2006-2008 to global imbalances and to the shortage of financial assets available for investors. This shortage led to the subprime crisis and then to the formation of a bubble in commodity markets.

On the other hand, some economists consider that commodity prices are formed above all in the physical markets – derivatives are therefore not responsible for market volatility. The price rises in 2006-2007 can also be explained by real factors: (i) the unexpected increase in global demand due to strong growth in the emerging economies, notably China and India; (ii) the low short-term price elasticity of supply and demand; (iii) the reluctance of oil producers to augment their production capacity (Krugman (2008a, 2008b); Kilian (2009); Kilian et Hicks (2009); Hamilton (2009)), (iv) the increasingly intensive use of agricultural land

to produce biofuels, which contributed to the surge in prices of agricultural products. Conversely, the turnaround in prices in the summer of 2008 was due to the global recession or to its expected onset.

Krugman (2008a, 2008b, 2008c) reacts vigorously to Masters' report (2008) and strongly denies the idea that financialisation has increased market volatility, as he is convinced that price fluctuations are due solely to interventions on physical markets. In his view, the high volatility of commodities is attributable to the short-term inelasticity of supply of and demand for most commodities. Players in the futures market have no impact on the spot price of commodities as long as their transactions neither change the physical quantities bought and sold on the spot market, nor the level of inventories. Kilian and Hicks (2009) estimate demand shocks using the revisions by professionals of GDP growth forecasts. They show that during the period in which oil prices rose there were large upward revisions of expectations of growth in emerging countries, which constituted shocks regarding expected demand. These adjustments of expectations largely account for the surge in oil prices that occurred during the mid-2003 to mid-2008 period and the subsequent turnaround. Hamilton (2009) analyses the link between financialisation and the spot price of oil. He judges that demand from index funds does not necessarily cause prices to rise. This might happen solely if a number of conditions arose simultaneously: (i) the presence of index funds increased forward prices; (ii) the price elasticity of demand was zero or close to zero; (iii) and inventories increased or production fell. Yet, according to the statistics available, inventories did not increase in 2006-2008. However, it is possible that oil producers did not wish to increase their output sufficiently. If this was the case, financialisation is not really implicated. Rather it was the speculative behavior of producers with their underground stocks that pushed up prices. Irwin and Sanders (2010) show that the positions taken by index traders have not led to an increase in prices on agricultural commodities markets. Moreover, larger long positions by index traders lead to lower volatility. These results are obtained through Granger causality tests over the 2006-2009 period for the main agricultural commodities. Buyuksahin and Harris (2009) show that price fluctuations lead the positions taken by noncommercial traders on the crude oil market, rather than the other way round. They obtain these results using a Granger causality test over the 2000-2008 period.

13.3.5. The Role of Derivatives in Volatility of Commodities Prices

Both fundamentals and financialisation are likely to explain the evolution in prices. For Currie *et al.* (2010), economists at Goldman Sachs, the formation of commodity prices takes place above all on the physical spot markets. However,

they admit that speculation partly contributed to the rise in oil prices in 2006-2008 and calculate its impact to be USD 9.50 per barrel. But contrary to the above-mentioned analyses, index investors only appear to have slight impact because, due to their passive management, they provide little information to the markets. Hence, changes in their positions are not likely to move prices. Conversely, active investors' positions may have had an impact on prices. These conclusions are consistent with those of a previous study carried out for Goldman Sachs by Greely and Currie (2008).

Volatility in commodity prices significantly increased in the 2000s compared to the previous decades, even if we remove the 2008 crisis episode (Arrata and Coudert (2011b)). However, it is hard to incriminate the growth of derivatives markets for this movement because climatic considerations may also have played a role. Indeed, compared with very long periods, it is also not sure that the volatility in commodity prices has really increased as agricultural prices have been volatile since the dawn of time. This is precisely evidenced by Jacks *et al.* (2009) that study commodity prices going back to 1700. Volatility in commodity prices was even a key characteristic of the economy in the 18th century. In fact, globalization and the integration of markets have reduced price volatility. Admittedly their data stop at 2005, which does not include the peak of volatility observed during the 2007-2009 crisis. Yet, most studies that show a rise in volatility do so precisely on the basis of this crisis.

On the whole, the role of financialisation in market volatility remains tenuous, despite the strong positions taken in different papers. However, since volatility creates a climate of uncertainty that is detrimental to growth in supply, efforts should be made to reduce it through increased market regulation.

13.4. CREDIT DEFAULT SWAPS

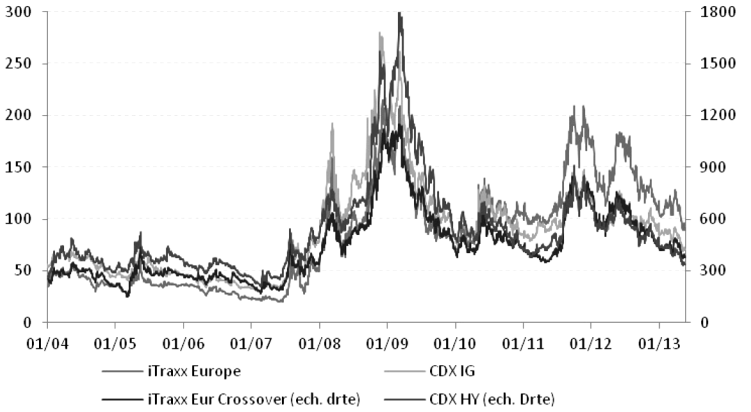
Credit derivatives are more recent instruments, aimed at protecting bondholders against the risk of a borrower's default. The most popular is the credit default swap (CDS), the market of which surged in the early 2000s. CDSs are over-the counter (OTC) instruments, contrary to a number of commodity futures and options that are traded on organized markets. Indeed, OTC markets are less regulated and more prone to counterparty risk than organized markets. Hence, a number of initiatives have been taken since 2008 in order to mitigate the counterparty risk on the OTC markets, especially by introducing more collateral requirements and clearing through central counterparty.

For corporates, the CDS market is now more liquid than the underlying bond market, which gives much importance to the CDS quotations. For sovereigns,

although bond markets are more liquid, the CDS market has also became a major indicator for the sovereign default risk.

CDSs are designed to hedge against default risk, but as any other derivatives, they can also be used to speculate. The stunning increase in the price of protection for corporates, especially banks in the 2008 crisis, has raised interrogations about the role of speculation on this market (Figure 13.4). That CDSs were traded over-the-counter in a rather opaque way has contributed to fuel fears on this market. Later on, in the sovereign crisis in the euro area, the rise in the CDS premia of the peripheral countries (Figure 13.5) has triggered new criticisms on the speculative use of the market, ending up to the European governments banning the use of "naked" sovereign CDS (buying a CDS without holding the underlying bond). Indeed, bond and CDS prices are now completely interconnected, to such an extent that it is hard to disentangle which leads the other (Coudert and Gex (2010a)).

Figure 13.4: Corporate CDS indexes for Europe and North-America



Source: JPMorgan 21/05/2013

13.4.1. The functioning of the CDS

Three parties are involved in a CDS: a buyer; a seller; and a reference entity, which is the borrower, corporate or sovereign. The CDS allows the buyer to hedge against the risk of a default by the borrower over a given horizon (often 5-year) for a given face value F. To do that, he (she) agrees to pay a premium as a percentage of the face value to the seller until maturity, or until default, if one occurs during the period. Premiums are usually paid quarterly. In return, the seller agrees to compensate his (her) loss in full in case of default.

Figure 13.5: Sovereign CDS index in for Europe

Source: JPMorgan 21/05/2013

In case of default, two settlements are possible: first, a physical settlement, where the CDS holder delivers the underlying security to the seller, who pays him (her) the full face value *F*; second a cash settlement, where the seller pays the buyer the amount $F \times (1 - R)$, where *R* is the recovery rate; the buyer then does not deliver the underlying security.

In theory, under both options, a CDS buyer who holds a bond with the same face value is fully protected by the CDS against the risk of default. This is obvious in the case of physical settlement. It is also true if there is a cash settlement and if the CDS market is in step with the bond market. The buyer will be able to recover $F \times R$ by selling his bond on the secondary market and the remainder $F \times (1 - R)$ from the CDS seller.

Though most derivatives, whether swaps or options, are theoretically designed to provide risk protection, they are also widely used to speculate on the future values of the underlying assets. CDS are no exception: many CDS buyers do not hold the underlying securities. You can buy a CDS on entity X without holding the underlying debt, thus recovering $F \times (1 - R)$ if X defaults. You could also buy a CDS on X without expecting a default. For example if you think that X's probability of default will increase, you can make a profit by buying a CDS now and unwinding the position later. For buyers, it is not a risky practice, since the cost is known when the contract is agreed and is confined to the premium payments. Like for equity options, the risk is taken on by the seller.

At any rate, the number of participants on the CDS market far exceeds the number of holders of the underlying bonds. As an example, in the 2005 Delphi failure, the notional value of CDS (USD 28 billion) exceeded actual bonds and

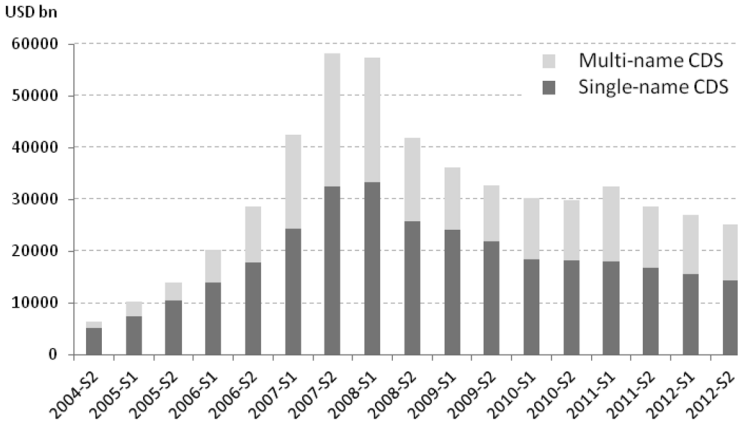
loans (USD 5 billion) by a factor of 5.6. Collins & Aikman, Delta Airlines and Northwest Airlines had even higher ratios (Coudert and Gex (2010c)). Because the amount of protection far exceeds the deliverable underlying assets, the default settlement process has changed. Settlement can no longer be exclusively physical, because this would artificially boost the price of the underlying bonds over the normally expected recovery rate. Furthermore, because some CDS on defaulting entities belong to indices, it became necessary to have a single recovery rate so that all investors with a position on the index could be treated fairly. After the 2005 failures involving automotive parts manufacturers and airlines, an auction system was introduced to provide fair treatment and to link the two settlement methods (Coudert and Gex (2010b, 2013b)).

13.4.2. The Rise and Fall of the Market

The CDS market soared from the beginning of the 2000 up to 2008, its notional amount reaching USD 58 trillion. Different compartments of the market expanded in line: the single-name CDSs, which concern one entity of reference as well as the CDS indexes that regroup a number of borrowers. The main indexes for investment grade firms are the CDX-IG for the US and the iTraxx for the euro area, which include 125 entities in each zone. The indexes for the high-yield corporate, are respectively the CDX-HY and the iTraxx Europe Crossover for the same area. Moreover, since the beginning of the 2000s, the sovereign CDS market expanded strongly first for the emerging countries, and then after the 2008 crisis for the advanced countries. Sovereign CDS indices were also created.

Before 2008, the expansion of the CDS market was partly due to some double accounting. For example, if a CDS holder wanted to sell back its CDS, most of the time, she had to sell another CDS on the same entity on a close maturity. After the bankruptcy of Lehman Brothers, some observers feared that the fragility of a CDS market would collapse in the settlement of such a large default. In fact there was a netting of the position, which drastically reduced the amounts of CDS to settle (Coudert and Gex (2010b)). From 2008 on, there was a fall in the notional amount outstanding due to the compression process, designed to consolidate the gross positions of the different participants. The fall of the market from USD 58 trillion to 25 trillion in 2012 is partly explained by this compression.

Figure 13.6: CDS notional outstanding



Source: BIS Statistics OTC Derivatives

13.4.3. CDS Premia and Bond spreads in a Default-Free Risk Portfolio

Obviously, the CDS premium should increase with the probability of default of the borrower and decline with the expected recovery rate, just like a bond spread. In theory, the CDS and bond spreads should be approximately equal for the same borrower and maturity (Duffie (1999); Hull and White (2000)). To see this, let us consider a portfolio including these two assets: a bond with a yield of y_t and a CDS with a premium of c_t issued by the same entity and with the same maturity. By purchasing this portfolio, an investor is covered against the default risk linked to the bond; her annual return is $y_t - c_t$. By arbitrage, this return should be equal to the risk-free rate of the same maturity denoted r_t. This means that the CDS premium should be equal to the bond yield minus the risk-free rate: $c_t = y_t - r_t$. As the bond spread s_t is also defined as the bond yield less the risk-free rate, this implies the approximate equality between the two spreads.

However, the strict equality does not hold, due to the imperfect match between the two types of contracts (Blanco *et al.* (2005)) and liquidity effects (Cossin and Lu (2005); Longstaff *et al.* (2005)). The "basis" b_t, defined as the difference between a bond spread and the CDS premium on the same entity and same maturity, is different from zero, although close to it.

In particular, Hull and White (2000) emphasized the role of accrued interests. In case of default, CDS holders can get the par value of the bond but not the accrued interests. The arbitrage relationship must be adjusted for this factor. Other factors also hinder complete arbitrage (Olléon-Assouan (2004); De Wit (2006)). Some

factors make the basis positive: (i) in the event of borrower default, the CDS holder may supply the cheapest to deliver bond; the seller therefore ends up with the most discounted securities. In this case, the CDS seller suffers a loss. To compensate for it, she will ask for a premium higher than the spread. (ii) Short positions are difficult and costly to take on the bond market. If economic agents expect the borrower to default, it is easier to buy CDS. (iii) The CDS contract makes a provision for payment in the event that the borrower should default; however, the default may concern only part of the bonds, which implies that the CDS seller is more exposed to risk than the bond holder.

Conversely, apart from accrued interests, other factors make the basis negative. (i) The CDS buyer is exposed to counterparty risk, if the protection seller defaults; this risk is all the more high as defaults may be correlated, preventing sellers from meeting their payments. (ii) On the CDS market, investors may sell protection at a price c_t without any initial outlay (apart from margins); this is not the case for an investment on the bond market, which must be financed through a loan. The plain arbitrage described by equations (1) and (2) assumes that investors are able to borrow at risk free-rate. In reality, it depends on the cost of the loan – the higher the cost, the less profitable the investment in bonds. For high yield investors, it may be more profitable to sell protection than to buy a bond. The CDS premium should therefore be lower than the bond spread. (iv) Securitization via collateralized debt obligation (CDO) issuance encourages banks to sell CDS, which contributes to reducing the basis.

13.4.4. CDS Premia and Bond Spreads in Empirical Studies

Several studies try to explain the determinants of the CDS premium empirically. Alexander and Kaeck (2006) study the variations of the sectoral components of the major European CDS index, the iTraxx. They show that these variations can be partly explained by the implied volatility of the DJ Eurostoxx 50. Moreover, according to these authors, the iTraxx is subject to regime switching and is more sensitive to the variations of stock market variables during periods of stress. Andritsky and Singh (2006) also show that the pricing of CDS could be affected by financial turmoil, especially concerning recovery rates, that turn out to be a key determinant in distressed periods.

Another issue relates to which market has the lead on the other in the price discovery process. In several studies, the CDS market has been evidenced to have the lead on the bond market. In other words, innovations on the CDS market have a greater tendency to spill over to bond spreads than the other way round (ECB (2004); Norden and Weber (2004); Blanco *et al.* (2005); Zhu (2006); Baba and Inada (2007); Coudert and Gex (2010a)). Crouch and Marsh (2005) show that

this link is especially strong for the auto sector. According to them, the CDSs of General Motors, Ford and DaimlerChrysler tend to lead their bond spread. These CDS also lead the CDS premia of the other firms of the sector, especially over the periods when the premia of the carmakers globally rise.

The links between CDS and equity are more controversial. A priori, as a rise in a CDS premium is linked to the firm's financial difficulties, it should go with a decline in its stock price, as consistent with the framework of Merton's model. Some studies find that the equity market has a lead over the CDS (Norden and Weber (2004); Byström (2005)), although results are mixed.

13.4.5. CDS Premia and Bond Spreads during Crises

Bond and credit default swap spreads have been particularly high and volatile since the onset of the 2008 crisis. They surged dramatically for financial institutions in the immediate aftermath of the bankruptcy of Lehman Brothers; later on, spreads on sovereign debt also soared across the board. On the one hand, these movements could be attributed to the normal reactions of markets: as defaults are expected to be more frequent during crises. On the other hand, credit derivatives markets have possibly overreacted during the crisis through speculation, driving the bond market into more bearish territories.

A key question is then to know whether the CDS market has a tendency to fuel rises in bond spreads during financial turmoil. This may well happen as holding long positions in CDS comes down to shorting bonds, which is not always possible on the corporate bond market. Therefore, once they have sold out their long positions in debt on a risky borrower, bearish market participants are more likely to be found trading on the CDS market. Consequently, the lead of the CDS market could be enhanced during crises. Are the relations between markets disrupted or accentuated during episodes of financial turmoil? Indeed, some papers hint at an impact of financial stress on the CDS market. For example, Alexander and Kaeck (2006) evidenced that the implied volatility of the DJ Eurostoxx 50 has an impact over the sectoral components of the iTraxx, the European CDS index. Andritsky and Singh (2006) also show that the pricing of CDS could be affected by financial turmoil, especially concerning recovery rates, that turn out to be a key determinant in distressed periods.

In the first half of 2010, while CDS and bond spreads soared for several European states, some observers blamed the CDS market and called for a ban on naked positions, arguing that they can result in rising costs for government debt (see for example: Portes (2010)). As a matter of fact, this is a relevant issue, as the information conveyed by bearish participants on the CDS market may accelerate the process of rising interest rates.

According to Coudert and Gex (2013a), the relationship between the CDS and the bond market may exacerbate some transmission channels between the two markets, although in a very different way for corporates and sovereigns. For corporates, the CDS market has a lead on the bond market in the price discovery process and the financial crisis has significantly amplified this role. This results from the greater liquidity of the CDS market than the bond market for corporates and can be rationalized in the following way. Once they have sold out all their bonds, pessimistic participants end up trading on the CDS market, as short selling of bonds is less easy. In those conditions, debt crises and risk aversion have a tendency to fuel the CDS market. On the other hand, for low-yield sovereigns, the bond spread is still leading the CDS spread, which is in line with the huge size of the government debt compared to that of the CDS market. However, this result does not hold in high-yield countries, where the default risk has surged and the CDS market has been growing very rapidly since the recent crisis.

13.5. CONCLUSION

Derivatives represent one of the most notable and influential innovations of the last decades in financial economics. In this chapter, we examine the evolution and the potential effects on the underlying market of three important instruments: equity options, commodity derivatives, and credit default swaps. Understanding the impacts of these three types of derivatives on financial markets has enormous importance for both policy and practical perspectives, in particular in assessing their costs and benefits.

As is often the case in economics, we can see pros and cons to the use of these derivatives and there is no consensus among economists on their overall effects on welfare. On the one hand, derivatives clearly play a useful role as long as they allow market participants to hedge against future price fluctuations. Moreover, a number of studies reviewed in this chapter concur to show that derivatives help produce information on the price of the underlying market. First, there is some evidence that equity options reduce the levels of asymmetric information among agents, and improve market efficiency by decreasing transaction costs and market risks. Second, commodity futures are also useful, not only to protect producers and final users against uncertainty in prices, but also because they allow investors to diversify their portfolio (due to their low correlation with equities and bonds), in addition, they may as well provide a protection against inflation in the long term. Third, by offering protection against the risk of a borrower's defaults CDSs contribute to reduce creditors' risk, hence allowing them in some cases to continue lending to risky borrowers.

On the other hand, when it comes to volatility, the jury is still out. The case is not clear yet whether derivatives absorb or amplify volatility. In addition, the expansion of insurance types of derivatives may feed the false impression of being protected as individual investors while, collectively, systemic risk has effectively increased. This is a sound warning against complacency as we are still recovering from the sub-prime crisis.

REFERENCES

ACHARYA, V., LOCHSTOER, L. and RAMADORAI, T., 2009, "Limits to arbitrage and hedging: evidence from commodity markets", *Working paper*, NYU Stern.

ALEXANDER, C. and KAECK, A., 2006, "Regimes in CDS Spread: A Markov Switching Model of iTraxx Europe Indices", *ICMA Centre Discussion Papers in Finance* DP2006-08.

ANAND, A., CHAKRAVARTY, S., 2007, "Stealth trading in options markets", *Journal of Financial and Quantitative Analysis* 42, 167-187.

ANDRITSKY, J.R. and SINGH, M., 2006, "The pricing of credit default swaps during distress", *Working Paper* 06/254, International Monetary Fund.

ARRATA, W. and COUDERT, V., 2011a, "Review of the literature on the financialisation of commodities markets and its impact on prices and volatility", Banque de France, *Financial Stability Directorate*, SEMASFI, mimeo.

ARRATA, W. and COUDERT, V., 2011b, "La volatilité et les corrélations ont-elles augmenté sur les marchés des matières premières", Banque de France, *Financial Stability Directorate*, SEMASFI, mimeo.

BABA, N. and INADA, M., (2007), "Price discovery of credit spreads for Japanese mega-banks: Subordinated bond and CDS", *Discussion Paper* 2007-E-6, Institute for Monetary and Economic Studies, Bank of Japan.

BATTALIO, R., HATCH, B., JENNINGS, R., 2004, "Toward a national market system for U.S. exchange-listed equity options", *Journal of Finance* 59, 933-962.

BERNALES, A. and GUIDOLIN, M., 2013, "The success of equity option listings and the role of the asymmetric information", *Working Paper* Bocconi University.

BIKHCHANDANI, S., HIRSHLEIFER, D., WELCH, I., 1998, "Learning from the behavior of others: Conformity, fads, and informational cascades", *Journal of Economic Perspectives* 12, 151-170.

BLANCO, R., BRENNAN, S. and MARSH, I.W., 2005, "An empirical analysis of the dynamic relationship between investment grade bonds and credit default swaps", *Journal of Finance* 60, No. 5, p. 2255-2281.

BODIE, Z. and ROSANSKY, V., 1980, "Risk and returns on commodity futures", *Financial Analyst Journal*, May-June.

BOEHMER, E., CHAVA, S., TOOKES, H.E., 2010, "Capital structure, derivatives and equity market quality", *Unpublished working paper*, EDHEC Business School.

BRANCH, B.S., FINNERTY, J., 1981, "The market impact of option listing", *Financial Review* 16, 1-15.

BRENNAN, M.J., CAO, H.H., 1996, "Information, trade, and derivative securities", *Review of Financial Studies* 9, 163-208.

BUYUKSAHIN, B. and HARRIS, J., 2009, "The Role of Speculators in the Crude Oil Futures Markets", *Working Paper*, U.S. Commodity Futures Trading Commission.

BUYUKSAHIN, B., HAIGH, M., HARRIS, OVERDAHL, J. and ROBE, M., 2009, "Fundamentals, trader activity and derivative pricing", *CFTC Working Paper*.

BUYUKSAHIN, B. and ROBE, M., 2010, "Speculators, commodities and cross-market Linkages, *CFTC Working Paper*.

BYSTRÖM, H.N., 2005, "Credit Default Swaps and Equity Prices: The iTraxx CDS Index Market", *Working Paper*, Lund University.

CABALLERO, R., FARHI, E. and GOURINCHAS, P.O., 2008, "Financial Crash, Commodity Prices and Global Imbalances, *NBER WP* 14521, December.

CAO, H.H., 1999, "The effect of derivative assets on information acquisition and price behavior in a rational expectations equilibrium", *Review of Financial Studies* 12, 131-163.

CAMASSES, J., LIU, P. and TANG, K., 2009, "Long-term economic relationships and correlation structure in commodity markets", *Working paper*, Cornell University.

CHEVALIER, J.-M., 2010, "Rapport du groupe de travail sur la volatilité des prix du pétrole", www.economie.gouv.fr/services/rap10/100211rapchevalier.pdf.

CHERN, K.Y., TANDON, K., YU, S. and WEBB, G., 2008, "The information content of stock split announcements: Do options matter?", *Journal of Banking & Finance* 32, 930-946.

CHINN, M.D. and COIBION, O., 2010, "The predictive content of commodity futures", *NBER Working Paper* 15830.

CONRAD, J., 1989, "The price effect of option introduction", *Journal of Finance* 44, 487-498.

COSSIN, D. and LU, H., 2005, "Are European corporate bonds and default swap markets segmented?", *Working Paper* 153, FAME.

COUDERT, V. and GEX, M., 2010a, "CDS and bond markets, which leads the other?", Banque de France, *Financial Stability Review* No. 14.

COUDERT, V. and GEX, M., 2010b, "The settlements of large defaults on the CDS market", *Economie Internationale* No. 123, issue 3, 2010.

COUDERT, V. and GEX, M., 2010c, "Contagion inside the CDS market: the case of GM and Ford crisis in 2005", *Journal of International Markets, Money, Finance and Institutions*, No. 20, p. 109-134.

COUDERT, V. and GEX, M., 2013a, "The interactions between the CDS and the bond markets in financial turmoil", *Review of International Economics*, vol. 21, issue 3.

COUDERT, V. and GEX, M., 2013b, "Why the settlement in the Greek CDS did not lead to the feared meltdown", Banque de France, *Financial Stability Review* No. 17, April 2013.

COUDERT, V. and RAYMOND, H., 2011, "Gold and financial assets: Are there any safe haven in bear markets?", *Economics Bulletin* No. 31, No. 2.

COVAL, J., JUREK, J., STAFFORD, E., 2009, "The economics of structured finance", *Journal of Economic Perspectives* 23, 3-26.

CROUCH, P. and MARSH, I.W., 2005, "Arbitrage relationships and price discovery in the Autos sector of the credit market", *Working Paper*, Cass Business School.

CURRIE, J., NATHAN, A., GREELY, D. and COURVALIN, D., 2010, "Commodity Prices and Volatlity: Old answers to new questions", Goldman Sachs, *Global Economics Paper* No. 194.

DAMODARAN, A., LIM, J., 1991, "The effects of option listing on the underlying stock return process", *Journal of Banking & Finance* 15, 647-664.

DANIELSEN, B.R., VAN NESS, B.F., WARR, R.S., 2007, "Reassessing the impact of option introductions on market quality: A less restrictive test for event-date effects", *Journal of Financial and Quantitative Analysis* 42, 1041-1062.

DARBY, M., 1994, "Over-the-counter derivatives and systemic risk to the global financial system", *Unpublished working paper*, National Bureau of Economic Research Working Paper No. 4801, Cambridge, MA.

DE JONG, C., KOEDIJK, K.G. and SCHNITZLEIN, C.R., 2006, "Stock market quality in the presence of a traded option", *Journal of Business* 79, 2243-2274.

DELONG, G., DEYOUNG, R., 2007, "Learning by observing: information spillovers in the execution and valuation of commercial bank M&As", *Journal of Finance* 62, 181-216.

DE WIT, J., 2006, "Exploring the CDS-bond basis", *Working Paper Research* 104, National Bank of Belgium.

DIAMOND, D.W. and VERRECCHIA, R.E., 1987, "Constraints on short-selling and asset price adjustment to private information", *Journal of Financial Economics* 18, 277-311.

DOMANSKI, D. and HEATH, A., 2007, "Financial investors and commodity markets", *BIS Quarterly Review*, March, 53-67.

DUARTE, J., YOUNG, L., 2009, "Why is PIN priced?", *Journal of Financial Economics* 91, 119-138.

DUFFIE, D., 1999, "Credit swap valuation", *Financial Analysts Journal* 55, p. 73-87.

EASLEY, D., KIEFER, N.M., O'HARA, M., PAPERMAN, J.B., 1996, "Liquidity, information, and infrequently traded stocks", *Journal of Finance* 51, 1405-1436.

EASLEY, D., O'HARA, M., PAPERMAN, J.B., 1998a, "Financial analysts and information-based trade", *Journal of Financial Markets* 1, 175-201.

EASLEY, D., O'HARA, M., SRINIVAS, P.S., 1998b, "Option volume and stock prices: Evidence on where informed traders trade", *Journal of Finance* 53, 431-465.

ERB, C. and HARVEY, C., 2006, "The strategic and tactical value of commodity futures", *Financial Analysts Journal* 62 (2), 69-97.

ETULA, E., 2009, "Broker-dealer risk appetite and commodity returns", *Working paper*, Federal Reserve Bank of New York Staff Reports No. 406.

EUROPEAN CENTRAL BANK, 2004, "Empirical evidence of price discovery in the CDS and bonds markets", *The euro bond market study*, 2004.

FAFF, R., HILLIER, D., 2005, "Complete markets, informed trading and equity option introductions", *Journal of Banking & Finance* 29, 1359-1384.

FAMA, E. and FRENCH, K., 1987, "Commodity futures prices: Some evidence on forecast power, premiums, and the theory of storage", *Journal of Business* 60, 55-73.

GEMAN, H. and KHAROUBI, C., 2008, "WTI crude oil Futures in portfolio diversification: The time-to-maturity effect", *Journal of Banking & Finance* 32 (2008) 2553-2559.

GEMAN, H. and OHANA, S., 2009, *Forward Curves, Scarcity and Price Volatility in Oil and Natural Gas Markets, Energy Economics*.

GORTON, G. and ROUWENHORST, G., 2004, "Facts and fantasies about commodity futures", NBER Working Paper 10595, published in *Financial Analysts Journal*, 2006, Vol. 62 (No. 2, March/April), 47-68.

GORTON, G., HAYASHI, F. and ROUWENHORST, G., 2007, "The fundamentals of commodity futures returns", *Working paper*, No. 13249. National Bureau of Economic Research, July.

GREELY, D. and CURRIE, J., 2008, "Speculators, Index Investors and Commodity Prices", Goldman Sachs, June 29.

GROSSMAN, S.J., STIGLITZ, J., 1980, "On the impossibility of informationally efficient markets", *American Economic Review* 70, 393-408.

HAMILTON, J., 2009, "Causes and consequences of the oil shock of 2007-2008", *Working paper*, UC San Diego.

HULL, J. and WHITE, A., 2000, "Valuing credit default swaps I: No counterparty default risk", *Journal of Derivatives* 8, p. 29-40.

IRWIN, S.H. and SANDERS, D.R., 2010, "The Impact of Index and Swap Funds on Commodity Futures Markets: Preliminary Results", *OECD Food, Agriculture and Fisheries Working Papers*, No. 27, OECD Publishing. doi: 10.1787/5kmd40wl1t5f-en.

JACKS, D., O'ROURKE, K. and WILLIAMSON, J., 2009, "Commodity price volatility and world market integration since 1700", *NBER Working Paper* 14748.

JENNINGS, R. and STARKS, L., 1986, "Earnings announcements, stock price adjustment, and the existence of option markets", *Journal of Finance* 44, 107-125.

KAUL, G., NIMALENDRAN, M., ZHANG, D., 2004, "Informed trading and option spreads" *Unpublished working paper*, University of Michigan Business School.

KAT, H. and OOMEN, R., 2006, "What every Investor should know about Commodities, Alternative Investment Research Centre", *Working Paper* No. 29.

KEYNES, J.M., 1930, *Treatise on Money*, Harcourt, Brace & Co., New York.

KILIAN, L., 2009, "Not all oil price shocks are alike: Disentangling demand and supply shocks in the crude oil market", *American Economic Review 99*, 1053-1069.

KILIAN, L. and HICKS, B., 2009, "Did Unexpectedly Strong Economic Growth Cause the Oil Price Shock of 2003-2008?", *CEPR Discussion Paper* No. 7265, April.

KRUGMAN, P., 2008a, "Speculative nonsense once again", mimeo, June 23, blog. http://krugman.blogs.nytimes.com/2008/06/23/speculative-nonsense-once-again/.

KRUGMAN, P., 2008b, "Fuels on the hill", *The New York Times*, June 27.

KRUGMAN, P., 2008c, "The oil nonbubble", *The New York Times*, 12 May.

KUMAR, R., SARIN, A., and SHASTRI, K., 1998, "The impact of options trading on the market quality of the underlying security: An empirical analysis", *Journal of Finance* 53, 717-732.

LONGSTAFF, F.A., MITHAL, S. and NEIS, E., 2005, "Corporate Yield Spreads: Default Risk or Liquidity? New Evidence from the Credit-Default Swap", *Journal of Finance* 60, no. 5, p. 2213-2253.

MASSA, M., 2002. "Financial innovation and information: The role of derivatives when a market for information exists", *Review of Financial Studies* 15, 927-957.

MASTERS, M., 2008, *Testimony before the Committee on Homeland Security and Governmental Affairs*, US Senate, May 20.

MASTERS, M., 2009, *Testimony before the Commodities Futures Trading Commission*, 5 August.

MAYER, J., 2009, "The Growing Interdependence between Financial and Commodity Markets", *United Nations Commission on Trade and Development*, Discussion Paper No. 195, October.

MAYHEW, S., MIHOV, V., 2004, "How do exchanges select stocks for option listing?", *Journal of Finance* 59, 447-471.

MCCOWN, R.J. and ZIMMERMAN, J.R., 2007, *Analysis of the Investment Potential and Inflation-Hedging Ability of Precious Metals*, Meinders School of Business, Oklahoma City University.

MONGARS, P. and MARCHAL-DOMBRAT, C., 2006, "Commodities: an asset class in their own right?", Banque de France, *Financial Stability Review*, No. 9, December.

NIJMAN, T. and SWINKELS, L., 2003, "Strategic and Tactical Asset Allocation to Commodities for Retirement Savings Schemes", *Discussion Papers Centre*, Tilburg University.

MERTON, R., 1998, "Applications of option-pricing theory: Twenty-five years later", *American Economic Review* 88, 323-349.

NORDEN, L. and WEBER, M., 2004, "The comovement of credit default swap, bond and stock markets: An empirical analysis", *CEPR Discussion Paper* No. 4674.

OLLÉON-ASSOUAN, E., 2004, "Techniques used on the credit derivatives market: credit default swaps", *Financial Stability Review* 4, Banque de France.

PETZEL, T., 2009, *Testimony before the CFTC*, July 28.

PINDYCK, R. and ROTEMBERG, J., 1990, "The excess co-movement of commodity prices", *Economic Journal* 100, 1173-1189.

PORTES, R., 2010, "Ban Naked CDS", eurointelligence.com, 18 March.

SANDERS, D.R., IRWIN, S. and MERRIN, R., 2008, "The adequacy of speculation in Agricultural Futures Markets: too much of a good thing?", *Marketing and Outlook Research Report* 2008-02, Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign.

SENCHACK, A.J. and STARKS, L.T., 1993, "Short-sale restrictions and market reaction to short-interest announcements", *Journal of Financial and Quantitative Analysis*, 28, 177-194.

SILVENNOINEN, A. and THORP, S., 2010, "Financialization, crisis and commodity correlation dynamics", *Working paper*, Queensland University of Technology.

SKINNER, D.J., 1989, "Options markets and stock return volatility", *Journal of Financial Economics* 23, 61-78.

SKINNER, D.J., 1990, "Options markets and the information content of accounting earnings releases", *Journal of Accounting and Economics* 13, 191-211.

SORESCU, S.M., 2000, "The effect of options on stock prices: 1973 to 1995", *Journal of Finance* 55, 487-514.

TANG, K. and XIONG, W., 2010, "Index Investing and the Financialization of Commodities", *Working Paper*, Department of Economics, Princeton University.

TAYLOR, N.J., 1998, "Precious metals and inflation", *Applied Financial Economics* 1998, 8, 201- 210.

TILL, H., 2009, *Has There Been Excessive Speculation in the US Oil Futures Markets? What Can We (Carefully) Conclude from New CFTC Data?*, EDHEC Risk Institute, November.

US SENATE PERMANENT SUBCOMMITTEE ON INVESTIGATIONS, 2009, *Excessive speculation in the wheat market*, Committee on Homeland Security and Governmental Affairs, June 24.

VANDEN, J.M., 2008, "Information quality and options", *Review of Financial Studies* 21, 2635.

WORKING, T., 1949, "The Theory of the Price of Storage", *American Economic Review*, December, 1254-62.

ZHU, H., 2006, "An empirical comparison of credit spreads between the bond market and the credit default swap market", *Journal of Financial Services Research*, Vol. 29 No. 3, June, p. 211-235.

Timeline of Money and Finance relevant Events during the last 50 Years[1]

[1] References to chapter numbers in the timeline do not necessarily mean that the event is mentioned in the chapter in question.

Date	Event	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8	Ch.9	Ch.10	Ch.11	Ch.12	Ch.13
1958, January	The European Economic Community (EEC) established according to the Treaty of Rome.						•							
1960, September	The Organization of the Petroleum Exporting Countries (OPEC), was formed by Iran, Iraq, Kuwait, Saudi Arabia and Venezuela at a conference in Baghdad. Subsequently Algeria, Angola, Ecuador, Gabon, Indonesia, Libya, Nigeria, Qatar and the UAE joined.		•											
1962, October	IMF General Agreement to Borrow (GAB) effective.	•												
1963, January 22	The Élysée Treaty: Treaty between France and Germany initiated by President Charles de Gaulle and Chancellor Konrad Adenauer providing for regular consultation between the two countries and cooperation on economic and other issues in Europe.				•		•							
1963, July	US imposes an Interest Equalization Tax to make investments in foreign securities less attractive.	•					•							
1963, December	The European Payments Union (EPU) is replaced by the European Monetary Agreement (EMA). 18 European OECD countries are members of EMA. The aim of EMA is to further liberalization of international trade and payments. BIS is agent for EMA.	•												
1964, April 13	Formal establishment of the Committee of the Governors of the Central Banks of the Member States of the EEC. Secretariat at BIS in Basel.	•		•										
1964, May	In GATT, the Kennedy Round starts.						•							
1964, October	The last bilateral payments agreement between EMA-member countries expires implying that all trade related payments between the EMA-countries hereafter take place in the free foreign exchange market.	•												
1964, November	Central Banks' sterling support package of USD 3 billion announced			•										
1965, February 4	President De Gaulle press conference: plea for a return to a pure gold standard.	•												
1965, February	The IMF Board of Representatives proposes to increase the quotas of all member countries by 25% and the quotas of some member countries by more. The increases were carried out during 1966.	•												
1965, February	President Johnson launches a voluntary foreign credit restraint programme to reduce the outflow of US private capital		•											
1965, April	Signing of the Merger Treaty which combines the executive bodies of The European Coal and Steel Community (ECSC), the European Atomic Energy Community (Euratom) and the European Economic Community (EEC) into a single institutional structure.						•							
1966, September 13	New sterling (GBP) support package (USD 900 million) announced.			•										
1966, October	The US Congress passes the Financial Institutions Supervisory Act (Law 89-695). The FDIC deposit insurance level is increased to USD 15,000.								•					
1967, May	Federal Reserve establishes an extensive network of swap agreements with central banks in industrialized countries.	•												
1967, May	The United Kingdom and Denmark apply for membership of the European Economic Community.						•							
1967, May	Seven French exchanges are combined to form a single National exchange.					•								
1967, June	The Commission signs the final act of the General Agreement on Tariffs and Trade (GATT) multilateral negotiation (Kennedy Round).		•				•							

Date	Event	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8	Ch.9	Ch.10	Ch.11	Ch.12	Ch.13
1967, July	The Merger Treaty enters into force fusing the executives of ESCS, EEC and Euratom. Hereafter, the European Communities have a single Commission and a Single Council.						•							
1967, November 18	The British Government devalues the GBP 14.3% against the USD.	•												
1967, November 29	IMF standby arrangement for UK	•												
1968, March 15	Gold crisis climax. Closure of the London gold market.	•												
1968, March 17	Central banks in the US and several other countries decide that central banks should no longer deliver gold to the gold market in London, resulting in two markets – an official market with transactions at the official price of gold – and a free market.	•												
1968, May	The IMF Board of Representatives approves the allocation of Special Drawing Rights (SDRs) to the member countries.	•												
1968, May	Political turmoil in France results in speculative capital movements in particular to Germany.				•									
1968, May 31	French decree re-establishing exchange controls.				•									
1968, July	The six EEC member countries remove custom duties allowing free cross-border trade. The EEC customs union completed.						•							
1968, December	Morgan Guaranty Trust Company founds the Euroclear System.					•					•			
1968, December	The Federal Reserve System increases the extent of swap agreements with BIS and other central banks.	•												
1969, January 1	Finland becomes member of OECD.						•							
1969, July 28	IMF Special Drawing Rights (SDRs) introduced	•												
1969, August 8	The French Franc is devalued 11.1% against USD.	•												
1969, September 28	German currency DEM floated.	•												
1969, October 24	Floating of DEM ends with a revaluation of 9.3% against the USD	•												
1969, December	The 12-year transitional period laid down by the Treaty on the European Economic Community (EEC) for implementing the Common Market comes to an end.						•							
1969	First meeting of Heads of States and Governments – later to become the European Council – in The Hague	•					•							
1969, December	The US Congress passes the Credit Control Act (law 91-151). The FDIC deposit insurance level is increased to USD 20,000.							•	•					
1970, January	The distribution of Special Drawing Rights (SDRs) to the IMF member countries starts. The allocation is proportional with the quotas.	•												
1970, October 26	The Werner Report is submitted to the EC Council and published.	•					•							
1971, March 22	The EC Council adopts the Werner Plan.	•					•							
1971, May	After massive inflows of capital, the German exchange market is temporarily closed and the Bundesbank's obligation to purchase foreign exchange suspended.	•												
1971, June 23	Agreement on terms of UK's entry into the EEC (on January 1, 1973).						•							

Date	Event	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8	Ch.9	Ch.10	Ch.11	Ch.12	Ch.13
1971, August 15	President Nixon issues Executive order 11615 and instructs the Secretary of the Treasury to "close the gold window" and stop converting foreign-held paper dollars for gold. The US unilaterally terminates convertibility of USD to gold.	•												
1971, December	Smithsonian Agreement. The USD is devalued by 7.89% against gold i.e. the official gold price is increased from USD 35 to USD 38. Fixed exchange rates are re-established after a period with floating exchange rates but without gold convertibility and with wider fluctuation limits (+/- 2.25%).	•												
1972, April 10	The currency "snake" is set up in Basel. Belgium, France, Germany, Italy, Luxembourg and the Netherlands agree to limit the margin of fluctuations between their currencies to 2.25%. (The "Snake in the tunnel").	•												
1972, May	Denmark, The United Kingdom and Ireland join the "Currency Snake".	•												
1972, June 23	The United Kingdom leaves the "Currency Snake" and GBP floats.	•												
1972	The Euroclear System is sold to Euroclear Clearance System Public Limited Company (owned by more than 120 major banks).					•				•				
1972, September	Agreement on a European Monetary Cooperation Fund.	•												
1973, January 1	UK, Ireland and Denmark join the EEC.						•							
1973, February 13	Italy (ITL) leaves the "Currency Snake".	•												
1973, March 19	The European countries decide that they will no longer ensure fixed exchange rates vs. USD. The tunnel disappears but the "snake" remains.	•												
1973, March	The German Mark revalued within the "Currency Snake".	•												
1973, June 1	European Monetary Co-operation Fund becomes operational. BIS assumes functions of agent	•					•							
1973, June	EU Directive (73/183/EEC) on abolition of restrictions on freedom of establishment and freedom to provide services in respect of banks and other financial institutions.					•	•							
1973, October 16	After outbreak of the Yom Kippur War (October 6-26), OPEC announces a decision to raise the posted price of oil by 70% and to start reducing production.		•											
1973, October 20	The OPEC countries establish a temporary oil embargo targeted at the US, Western Europe and Japan.		•				•							
1973, November	Central bank agreement to refrain from gold operations on the free market officially buried.	•												
1974	The Basel Committee on Banking Supervision (BCBS) established.							•	•					
1974, January	Committee of 20 (C20) meeting in Rome: attempt at full-scale reform of the international monetary system abandoned: generalised exchange-rate floating.	•												
1974, January 19	France (FRF) leaves the "Currency Snake".	•												
1974, March 17	OPEC announces the end of the oil embargo from October 1973.		•											
1974, June	Bankhaus Herstatt bank collapses.												•	
1974, October	The US Congress passes the Equal Credit Opportunity Act (law 93-495).							•						
1974, November	IEA, International Energy Agency established within the framework of OECD to implement an international energy programme.		•											

Date	Event	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8	Ch.9	Ch.10	Ch.11	Ch.12	Ch.13
1974, December	The European Regional Development Fund established.		•				•							
1974, December	In response to bank failures, the G10 Governors establish the Basel Committee on Banking Regulations and Supervisory Practices.							•						
1975, March 8	Publication of the Marjolin Report on EMU and on Institutional and Structural disparities between EC member states.	•					•							
1975, March 19	Creation of the European Unit of Account.	•												
1975, July	A Treaty giving the European Parliament wider budgetary powers and establishing a Court of Auditors is signed. Will enter into force June 1977.						•							
1975, July 10	FRF rejoins the Snake.	•												
1975, November 15-17	First meeting in the Group of Seven (G-7) in Rambouillet. France endorses currency floating.	•			•									
1975, December	Publication of the Leo Tindemans Report on European Union. It includes monetary and fiscal policy proposals.	•					•							
1975, December	"Basel Concordat" calls on host- and home-country authorities to share supervisory responsibility for banks' foreign activities.							•			•			
1976, January 7	IMF Agreement on use of SDRs.	•												
1976, March 15	FRF leaves the snake.	•												
1976, April	The IMF member countries approve a revised Treaty based on a proposal from a meeting in Jamaica which legalizes floating exchange rates, abolishes gold as basis and abolishes exchange rate parities.	•												
1976, July	Proposal by Willem Duisenberg concerning target zones for floating European currencies.	•												
1976, September 29	Sterling Crisis: UK requests a standby arrangement from IMF.	•												
1976, October 18	Exchange rate adjustments in the "Currency Snake". DEM revalued by 2%.	•												
1976, November	United Kingdom and Italy request bail-outs from the IMF without prior consultations with their European partners.	•												
1977, April 4	Further realignments within the snake. SEK, NOK, DKK and FIM devalued.	•												
1977, August 28	SEK leaves the snake. Further devaluations of NOK and DKK	•												
1977, December 12	First EU Banking Directive: (77/780/EEC).										•			
1978	Amsterdam Stock Exchange launches European Options Exchange.					•						•		
1978, February 13	NOK devalues by 8%.	•												
1978, April	The new IMF Treaty enters into force.	•												
1978, October 16	Realignments in the snake. DEM revalued vis-à-vis other currencies.	•												
1978, November	The European Council establishes the European Monetary System (EMS) based on a European Currency Unit (ECU) and decides to set up a committee to consider adjustments to institutional mechanisms and procedures in the context of enlargement. The EMS includes mutual bilateral central rates, intervention bands and a divergence indicator.	•												

Date	Event	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8	Ch.9	Ch.10	Ch.11	Ch.12	Ch.13
1978, December 12	NOK leaves the snake.	•												
1978-1983	Spanish banking crisis.												•	
1979, March	The EMS launched. Two fluctuation bands: 2.25% (Belgium, Denmark, France, Germany, Ireland, Luxembourg, the Netherlands) and 6% (Italy).	•												
1979, April	New banking Act in the UK. Extends Bank of England's regulatory powers over banks and provides better protection of depositors.			•				•						
1979, June 28	OPEC decrees oil price increase by 24%: Second "oil shock".		•											
1979, September 24	Realignment of EMS central rates. DEM revalued by 2% and DKK devalued by 3%.	•												
1979, November 30	EMS realignment: DKK devalued by 4.76%.	•												
1980, January 21	Gold prices peak at USD 850 per ounce, a rise of 340% since November 1978.	•												
1980, March	Italian Lire devaluated 6%.	•												
1980, March	The US Congress passes the Depositary Institutions Deregulation and Monetary Control Act (law 96-221). The Law allows Savings and Loans Institutions to offer checkable deposits.							•	•					
1980, April 17	People's Republic of China replaces Taiwan at IMF and World Bank.	•	•				•							
1981, January	Greece becomes the 10th member of the European Community.						•							
1981, March 23	EMS realignment: ITL devalued by 6%.	•												
1981, August	US Economic Recovery Tax Act. The law allows Savings and Loans Institutions to sell mortgage loans.					•							•	
1981, October 5	EMS Realignment. NLG and DEM revalued by 3% and 5.5% respectively vis-à-vis other currencies.	•												
1982, February 22	EMS Realignment. Devaluations of BEF (8.5%) and DKK (3%).	•												
1982, March	Hungarian debt crisis												•	
1982, June 14	EMS realignment. Revaluation of DEM and NLG. Devaluation of FRF and ITL.	•												
1982, August 12	Mexican debt crisis.												•	
1982, August 31	Mexico imposes exchange controls and nationalises its banking system.	•											•	
1982, September 30	LIFFE, the London International Financial Futures Exchange established.					•								•
1982, October 8	SEK devalued by 16%.	•												
1983, January 10	GRD devalued by 15.5%.	•												
1983, March 21	EMS realignment: Revaluations of DEM, NLG, DKK and BEF. Devaluations of FRF, IEP and ITL.	•												
1983, April	Creation of the International Organization of Securities Commissions (IOSCO).							•						
1983, September	MEP Altiero Spinelli presents a draft Treaty on European Union to the European Parliament.						•							
1983, November 30	IMF quotas increased by SDR 29.2 billion needed to meet the debt crisis.	•												
1984, January 1	Creation of free-trade area between EC and EFTA.						•							
1984, February	A large majority of the European Parliament adopts Spinelli's draft Treaty.						•							

Date	Event	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8	Ch.9	Ch.10	Ch.11	Ch.12	Ch.13
1984, May	Continental Illinois Bank (US) collapses												•	
1984, December 3-4	A European Council meeting in Dublin decides to reinforce the EMS and to grant the ECU a more important role.	•												
1985, March 12	Committee of EC Governors agrees on improving conditions of using and holding ECU.	•												
1985, June	The Committee of Governors of the central banks of the member states adopts measures designed to strengthen the EMS.	•			•									
1985, July 1	Greece (GRD) joins the EMS.	•												
1985, July 22	EMS realignment. ITL devalued by 6% vis-à-vis other currencies.	•												
1985, September 22	The Plaza Agreement, an agreement between the governments of France, West Germany, Japan, the United Kingdom and the United States (G5) to depreciate the US dollar in relation to the Japanese Yen and the German DEM by intervention in currency markets. After the agreement, the US trade deficit with Western Europe was reduced.		•		•									
1985, December 2-3	A European Council meeting in Luxembourg agrees to amend the Treaty of Rome and to revitalize the process of European integration by drawing up a Single European Act.						•							
1985, December 20	Directive (85/611/EEC) on the coordination of laws, regulations and administrative provisions relating to undertakings for collective investments in transferable securities (UCITS).					•	•							
1986, January 1	Spain and Portugal join the European Communities.						•							
1986, February	The Single European Act is signed in Luxembourg and in The Hague.						•							
1986, February 15	The futures exchange MATIF, Paris launched.					•						•		•
1986, April 7	EMS realignment: Revaluation of the NLG and DEM (3%) as well as BEF and DKK (1%). FRF devalued (3%).	•												
1986, August 4	EMS realignment. IEP devalued (8%).	•												
1986, October 27	The "Big Bang": Deregulation of financial markets in the UK initiated by the Thatcher Government including abolition of fixed commission charges and the distinction between stock jobbers and stock brokers on the London Stock Exchange and change from open-outcry to electronic screen-based trading.					•								
1986-1989	The US Federal Savings and Loans Insurance Corporation closes 296 Savings and Loans Institutions.								•					
1987, January 12	EMS realignment: Revaluation of NLG and DEM (3%) and of BEF (2%).	•												
1987, February 22	The Louvre Accord: G6 Finance ministers and central bank governors agree to stabilize and maintain exchange rates around their current levels.	•					•							
1987, May 13	Spain (ESP) joins the EMS.	•												
1987, July 1	The Single European Act enters into force.						•							
1987, September 12	Basel-Nyborg Agreement on a comprehensive strategy and measures to strengthen the EMS.	•												
1987, October 19	Black Monday. Stocks drop 23% on Wall Street. Also strong declines in stock prices in Asia and Europe.					•							•	
1987, November 10	Portugal (PTE) joins the EMS.	•												

Date	Event	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8	Ch.9	Ch.10	Ch.11	Ch.12	Ch.13
1988	Basel I (1988 Basel Accord) published.							•	•					
1988, March	The EU Commission publishes the report: Europe 1992 – The overall challenge.						•							
1988, June 24	European Commission approves directive providing for full liberalisation of capital movements on 1 July 1990.						•							
1988, June 24	European Council sets up Committee for the Study of EMU (The Delors Committee).	•												
1988-1992	Norwegian banking crisis.										•		•	
1988, July	Central bank governors endorse BCBS's document: "International Convergence of Capital Measurement and Capital Standards" or "Basel Capital Accord" to be implemented by the end of 1992.(Basel I).							•	•					
1989, April 12	The Delors Committee presents its report on the economic and monetary union (EMU).	•												
1989, June 19	Spain (ESP) enters the EMS. (6% fluctuation band).	•												
1989, June	Rio de Janeiro stock exchange collapse					•								
1989, November 9	The Berlin Wall collapses.						•							
1989, December 8	EC Council Decision to set up the European Bank for reconstruction and Development (EBRD).						•							
1989, December 15	Second EU Banking Directive. (89/646/EEC).										•			
1989, December 18	EU Directive on a solvency ratio for credit institutions. (89/647/EEC).							•			•			
1990, January 5	ITL devalues and moves to narrow band in the EMS.	•												
1990, April	The European Council agrees on a common approach on German reunification and on the Community relations with Central and Eastern European countries.						•							
1990, May 29	Agreement establishing the European Bank for Reconstruction and Development (EBRD) to provide financial support to Central and Eastern Europe is signed in Paris.						•							
1990, June	The EEC and EFTA start formal negotiations for the creation of the European Economic Area (EEA).						•							
1990, July 1	The German Democratic Republic (DDR) adopts the economic and legal framework of The Federal Republic of Germany.						•							
1990, July 1	First EMU stage starts. Spain, Portugal, Greece and Ireland are temporarily granted an exceptional regime.	•												
1990, July 2	Monetary Union between East and West Germany takes effect.	•					•							
1990, October 3	German reunification officially completed according to the German constitution. The länder of former DDR become part of the EU.						•							
1990, October 8	United Kingdom (GBP) joins EMS.	•												
1990, December	At the European Council meeting in Rome two intergovernmental conferences on EMU and on political union are launched.	•												
1991, April 14	EBRD inaugurated in London.						•							
1991, July 5	Bank of Credit and Commerce International (BCCI) closed by central banks after allegations of fraud.								•				•	
1991, August 19-21	Failed coup in the Soviet Union													

Date	Event	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8	Ch.9	Ch.10	Ch.11	Ch.12	Ch.13
1991, December 26	Legal dissolution of the USSR.													
1991, December	A European Council in Maastricht reaches agreement on a draft Treaty on European Union								•					
1991, December	Federal Deposit Insurance Corporation Improvement Act: Introduces "Prompt Corrective Action", i.e. a framework for supervisory actions concerning insured depositary institutions that are not adequately capitalised.								•					
1992	LIFFE merges with the London Traded Options Market (LTOM)					•								•
1992	Swedish banking crisis.												•	
1992, February 7	Maastricht Treaty (Treaty on European Union) signed by the members of EC.						•							
1992, April 6	Portuguese Escudo (PTE) enters the EMS. (6% fluctuation band).	•												
1992, April 6	EU Directive on supervision of credit institutions on a consolidated basis.							•						
1992, May 7	Swiss referendum in favour of IMF and World Bank membership.	•												
1992, June 1	Russia joins the IMF and the World Bank.	•												
1992, June 2	At a referendum in Denmark a majority of the voters vote against ratification of the treaty on European Union.						•							
1992, September 14	EMS realignment: ITL devalued (3.5%)	•												
1992, September 16	Black Wednesday. ITL, ESP and GBP forced through the floor of the EMS. GBP and ITL leave the EMS. Swedish discount rate temporarily at 500%.	•											•	
1992, November	Spanish peseta and Portuguese escudo devalued 6%.	•												
1992, December	At a referendum in Switzerland a majority votes against ratification of the EEA agreement.						•							
1992, December	In Edinburgh Denmark is offered special arrangements under the Treaty on European Union.						•							
1993, January 1	Single European Market comes into force: freedom of movement for goods, services, persons and capital.						•							
1993, February	Irish punt devalued 10%.	•												
1993, March	EU Council Directive (93/6/EEC) on capital adequacy of investment firms and Credit institutions adopted.							•						
1993, May 10	EU Council Directive (93/22/EEC) on investment services in the securities field.					•		•						
1993, May	In a second referendum, the Danish people vote in favour of the Treaty of European Union.						•							
1993, May	Spanish peseta devalued 8% and Portuguese escudo devalued 6.5%).	•												
1993	Long Term Capital Management created.												•	
1993, August 10	ERM Crisis. Pre-emptive revision of the mechanism with the adoption of 15% floating margins for most currencies.	•												
1993, November 1	Entry into force of the Maastricht Treaty after completion of all ratification procedures.						•							
1993, December	The Council concludes an agreement creating the European Economic Area (EEA).						•							
1993, December 31	The Committee of Governors of the Central Banks of the Member States of the EU, set up in 1964, is wound up and replaced by EMI.	•		•										

Date	Event	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8	Ch.9	Ch.10	Ch.11	Ch.12	Ch.13
1994, January 1	The North American Free Trade Agreement (NAFTA) signed by Canada, USA and Mexico enters into force.						•							
1994, January	Second EMU stage starts.	•												
1994, January	The European Monetary Institute established.	•		•										
1994, May:	The Board of Governors of the European Investment Bank establishes the European Investment Fund.					•	•							
1994, July	BCBS publishes "Guidelines for the Supervision and Risk Management of Derivative Business".					•		•						•
1994, May 30	Directive (94/19/EC) on deposit guarantee schemes.							•						
1994, November	A referendum in Norway rejects accession to the European Union.						•							
1994, November	EMI moves from Basel to Frankfurt.			•										
1994, December	Mexican Crisis. Devaluation of Peso (more than 50%) against the USD.	•											•	
1995, January 1	Uruguay Round enters into force. GATT is transformed to WTO.		•				•							
1995, January 1	Austria, Finland and Sweden become members of the European Union.						•							
1995, February 26	Barings Bank (UK) collapses as a result of huge losses in derivatives trading						•						•	•
1995, March 20-21	The Stability Pact for Central and Eastern Europe is signed and adopted in Paris.	•					•							
1995, March 6	Devaluation of ESP and PTE.	•												
1995, May	Liechtenstein joins the EEA.						•							
1996, May	The EU Commission adopts a Green Paper on financial services.					•	•	•	•	•				
1996, October 14	FIM joins the EMS.	•												
1996, November 24	ITL re-enters the EMS.	•												
1996, December	The European Council in Dublin agrees on elements necessary for the single currency: legal framework, stability pact and new exchange rate mechanism.	•					•							
1997, April	BCBS releases its "Core Principles for Effective Banking Supervision".							•	•					
1997, May	The UK Chancellor of the Exchequer announces reform of financial services regulation in the UK and the creation of a new regulator: The Financial Services Authority (FSA).							•						
1997, June 17	Agreement on the Treaty of Amsterdam (and Stability and Growth Pact).						•							
1997, July	Asian financial crisis starts. Thailand, Indonesia, South Korea, Malaysia, Laos and the Philippines strongly affected.	•											•	
1997, June	The Commission adopts action plan for the Single Market and EU's Stability and Growth Pact adopted.				•		•							
1997, October 2	Treaty of Amsterdam signed.						•							
1997, December	Agreement is reached on financial services within the World Trade Organization (WTO) framework.						•							
1998	OM AB acquires Stockholm Stock Exchange.					•								
1998, March	The Greek Drachma (GRD) enters the EMS.	•												

Date	Event	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8	Ch.9	Ch.10	Ch.11	Ch.12	Ch.13
1998, March	The EU Commission adopts the Convergence report and recommends that 11 member states adopt the Euro on 1. January 1999.	•												
1998, June	Responsibility for UK banking supervision transferred from Bank of England to FSA.							•	•					
1998, June 30	Inauguration of the European Central Bank (ECB) in Frankfurt. Wim F. Duisenberg first President.			•	•									
1998, August 17	Russian financial crisis. The Russian government devalues the rouble, defaults on domestic debt, and declares a moratorium on payments to foreign creditors.	•											•	
1998, September	Long Term Capital Management bail out.												•	
1999	OECD Principles of corporate governance adopted.									•				
1999, January 1	Third EMU stage starts. The Euro created. Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, the Netherlands, Portugal and Spain adopt the Euro as their official currency.	•												
1999, January	ERM II set up as a successor to ERM. A central rate between the euro and the country's currency is agreed. Denmark and Greece participate in the ERM II from the beginning.	•												
1999, February	Creation of the Financial Stability Forum (FSF) by G7 Finance ministers and Central bank Governors.			•	•									
1999, April	The Brussels Exchanges (BXS) established.					•								
1999, May	The Amsterdam Treaty enters into force.						•							
1999, May	EU's Financial Services Action Plan (FSAP) published.					•		•	•					
1999, June	Paris Bourse SBF SA formed by a merger.					•						•		
1999, July-September	US Hedge Fund LTCM under liquidation.												•	
1999, September	Washington Agreement on Gold: European central banks announce they will limit gold sales for a 5-year period.	•												
1999, November 12	The US Congress passes the Gramm-Leach-Bliley Act and Financial Services Modernization Act. Repeal most of the restrictions imposed by the Glass-Steagall Act of 1933.							•		•				
2000	The Euroclear Bank is incorporated in Belgium.					•				•				
2000, March	The Lisbon European Council sets the goal of implementing FSAP by 2005.					•		•	•					
2000, March 20	Directive (2000/12/EC) relating to the taking up of the business of credit institutions. Seven banking directives and their amending directives are replaced by one single banking directive (codification) aiming to improve transparency of EU regulation.					•	•	•		•	•			
2000, March 10	Burst of Dot-Com bubble. Strong declines in share prices of technology companies.					•								
2000, May	FSA takes over the Role of UK Listing Authority from London Stock Exchange.					•		•						
2000, September	Euronext formed by a merger of the stock exchanges in Amsterdam, Brussels and Paris.					•								
2000, September	A referendum in Denmark rejects the joining of the Euro zone.	•												
2000, September 22	ECB in joint action with the US Federal Reserve System and Bank of Japan intervenes in support of the Euro.	•	•		•									
2001, January 1	Greece becomes the 12th member of the Euro zone.	•												

Date	Event	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8	Ch.9	Ch.10	Ch.11	Ch.12	Ch.13
2001, February 26	Treaty of Nice signed.						•							
2001	Euroclear bank merges with Sicovam SA, the CSD of France which is renamed Euroclear France. The Dutch CSD and the Belgian CSD become partners.					•								
2001, September 11	Terror attack on World Trade Center, New York and Washington causes global stock markets to drop sharply.					•								
2001, December	The Government of Argentina suspends payments on external debt.	•											•	
2002, January 1	Introduction of euro coins and bank notes in the 12 participating EU member countries	•			•									
2002, January	Euronext buys LIFFE.					•								
2002, February	The Euro becomes the sole currency within the 12 participating member states. Dual circulation comes to an end.	•												
2002, July	EU Regulation (1606/2002) on application of international accounting standards.						•	•						
2003, February	Treaty of Nice enters into force.						•							
2003, March	OECD Code of Liberalisation of Capital Movements.		•				•							
2003, March	EU Directive (2001/34/EC) the Prospectus Directive.					•		•						
2003, September	Helsinki Stock Exchange (HEX) merges with OM AB and becomes OMX.					•								
2003, September	A referendum in Sweden rejects joining the Euro zone.	•												
2003, November	Rejecting the Commission's recommendation for a Council decision to this effect, the Ecofin Council decides not to step up the excessive deficit procedures for France and Germany and to put the implementation of the SGP "in abeyance".	•												
2003, December	Directive (2003/71/EC) on the prospectus to be published when securities are offered to the public or admitted to trading on a regulated market.					•	•							
2004	Revised OECD Principles of corporate governance adopted.									•				
2004, April 21	EU Directive (2004/39/EC) on markets in financial instruments amending Council Directives (85/611/EEC) and (93/6/EEC) and Directive (2000/12/EC) and repealing Council Directive (93/22/EEC). (MiFID I).					•		•						
2004, May	EU's biggest enlargement: Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia and Slovenia join the EU.						•							
2004, June 26	G10 Central bank governors and heads of supervision endorse the release of "International Convergence of Capital Measurement and Capital Standards: a Revised Framework", better known as "Basel II" to be implemented by the end of 2006.							•	•					
2005, January	OMX acquires Copenhagen Stock Exchange.					•								
2005, February	The ECOFIN Council adopts a Code of Practice concerning statistical authorities with 15 principles relating to the institutional environment of the ESS, its statistical processes and its statistical output, and aims to provide a general framework for enhancing the quality of European statistics.						•		•					
2005, March	EU's Stability and Growth Pact reformed increasing the focus on structural (rather than nominal) budgetary positions and structural adjustment.	•			•								•	

Date	Event	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8	Ch.9	Ch.10	Ch.11	Ch.12	Ch.13
2005, March	Eurostat declares that it is not in a position to validate the deficit figures notified by the Greek authorities.	•												
2005, July 9	BCBS issues "Enhancing Corporate Governance for banking organisations".							•	•	•	•			
2006, February 1	Ben Bernanke succeeds Alan Greenspan as Chairman of the Board of Governors of the Federal Reserve System.			•										
2006, February	The European Parliament adopts a report on legislation opening up the EU single market for services.					•	•							
2006, February	Federal Deposit Insurance Reform Act: The limit for insurance coverage raised to USD 250,000.							•						
2006, June	BIS. Basel II: International convergence of capital measurement and capital standards implemented.							•	•					
2006, June 14	EU Directive (2006/48/EC) on credit institutions.					•		•						
2006, June 14	EU Capital Adequacy Directive (2006/49/EC)					•		•						
2006, October	OMX acquires 10% of the owner of Oslo Stock Exchange.					•								
2006, December	OMX acquires Iceland Stock Exchange.					•								
2007, January	Romania and Bulgaria joins the EU.						•							
2007, January	Slovenia joins the Euro zone and adopts the euro as its official currency.	•												
2007, February	The Federal Home Loan Mortgage Corporation (Freddie Mac) announces that it will no longer buy the most risky subprime mortgages and mortgage related securities.												•	
2007, March 25	Declaration on the occasion of the 50th anniversary of the signature of the Treaty of Rome.						•							
2007	NYSE Group and Euronext combined.					•								
2007, April 2	New Century Financial Co., the Second largest subprime mortgage lender in the US, files for Chapter 11 bankruptcy protection.												•	
2007, May	NASDAQ buys OMX. The merged company renamed NASDAQ OMX Group.					•								
2007, June	Standard and Poor's and Moody's Investor Services downgrade over 100 bonds backed by second-lien subprime mortgages.												•	
2007, August	BNP Paribas halts redemptions on three investment funds.										•		•	
2007, September	The Chancellor of the Exchequer authorizes the Bank of The United Kingdom to provide liquidity support for Northern Rock, the UK's fifth largest mortgage lender.										•		•	
2007, October	NASDAQ purchases Boston Stock Exchange.					•						•		
2007, December 13	Treaty of Lisbon signed.						•							
2007, December	The FOMC authorizes temporary reciprocal currency arrangements (swap lines) with ECB and the Swiss National Bank (SNB). The Fed states that it will provide up to USD 20 billion and USD 4 billion to the ECB and SNB respectively.	•												
2008, January	Cyprus and Malta join the Euro zone.	•												
2008	Euroclear acquires the CSDs of Finland and Sweden.					•								
2008, February	Northern Rock taken over by UK Government.												•	

Date	Event	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8	Ch.9	Ch.10	Ch.11	Ch.12	Ch.13
2008, March	The Federal Reserve Bank of New York announces that it will provide term financing to facilitate JPMorgan Chase & Co's acquisition of The Bear Stearns Companies Inc. A Limited liability company (Maiden Lane) is formed to control USD 30 billion of Bear Stearns assets that are pledged as security for USD 29 billion in term financing from the NY Fed at its primary credit rate.												•	
2008, March	The Fed establishes the Primary Dealer Credit Facility (PDCF) extending credit to primary dealers at the primary credit rate against a broad range of investment grade securities.				•								•	
2008, May	Treaty on the Functioning of the European Union reformed.						•							
2008, July	The Securities Exchange Commission (SEC) issues an emergency order temporarily prohibiting naked short selling in the securities of Fannie Mae, Freddie Mac, and primary dealers, at commercial and investment banks.												•	
2008, July	The FOMC increases its swap line with the ECB to USD 55 billion.	•											•	
2008, September	The Federal Housing Finance Agency (The US Government) place Fannie Mae and Freddie Mac in Government conservatorship. In fact, FHFA steps in to bail out the two mortgage lenders. Several European banks in difficulties.												•	
2008, September	The Federal Reserve Board expands the list of eligible collateral for the PDCF to include any collateral that can be pledged in the tri-party repo system of the two major clearing banks.				•								•	
2008, September 15	Lehman Brothers Holdings Inc. files for Chapter 11 bankruptcy protection.												•	
2008, September 16	The Federal Reserve Board authorizes the Federal Reserve Bank of New York to lend up to USD 85 billion to the American International Group (AIG) under Section 13 (3) of the Federal Reserve Act.				•								•	
2008, September 29	The FOMC authorizes a USD 330 billion expansion of swap lines with Bank of Canada, Bank of England, Bank of Japan, Danmarks Nationalbank, ECB, Norges Bank, Reserve Bank of Australia, Sveriges Riksbank and SNB. Lines outstanding now USD 620 billion.	•											•	
2008, September 30	Irish Finance Minister Brian Lenihan announces a government decision to guarantee all deposits and debts of six major Irish banks and their subsidiaries abroad.							•					•	
2008, September	The Icelandic financial crisis starts. Glitnir Bank, Landsbanki and Kaupthing Bank go into receivership.												•	
2008, October	US Congress passes the Emergency Economic Stabilization Act of 2008, which establishes the USD 700 billion Troubled Asset Relief Program (TARP).												•	
2008, October 12	The Euro Area heads of state and government announce their decision to provide coordinated guarantees to senior bank debt issuance and, when needed, to provide financial institutions with capital resources.												•	
2008, December 12	The EU Member States endorse the "European Recovery Plan" for coordinated temporary stimulus measures.			•									•	
2009, January 1	Lisbon Treaty enters into force.						•							
2009, January 1	Slovakia joins the Euro zone.	•												
2009	Xtrakter becomes a wholly owned subsidiary of Euroclear SA/NV.					•								
2009, February	The de Larosière report on stronger financial supervision published.							•	•				•	
2009, March	Directive (2009/14/EC) on deposit guarantee schemes as regards the coverage level and the payout delay.							•						

Date	Event	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8	Ch.9	Ch.10	Ch.11	Ch.12	Ch.13
2009, April:	The G20 Summit agrees to channel EUR 832 billion into the IMF and other institutions and to tighten the rules on financial markets.	•						•	•				•	
2009, July 13	Directive (2009/65/EC) on the coordination of laws, regulations and administrative provisions relating to undertakings for collective investment in transferable securities (UCITS), repealing directive (85/611/EEC).					•	•							
2009, September	EU Directive (2009/111/EC) amending a number of directives on capital adequacy, large exposures, supervision and crisis management.					•	•						•	
2009, December	The three main rating agencies – Fitch, Moody's and Standard and Poor's – downgrade Greece's sovereign credit rating.												•	
2009, December	The Lisbon Treaty enters into force.						•							
2010, February	Heads of states and governments agree to support the Greek Government.	•	•		•		•							
2010, May	Heads of states and governments within the Euro area agree to deepen fiscal consolidation, stronger economic coordination and budgetary surveillance to defend the Euro.	•												
2010, May	The EFSF and EFSM are set up.	•			•									
2010, May	Euro area member states and the IMF announce a three-year programme for Greece, totalling EUR 110 billion.	•											•	
2010, May	The ECB Governing Council decides to conduct interventions in the euro area public and private debt securities markets (Securities Markets Programme) and to adopt a fixed rate tender procedure with full allotment in the regular 3-month longer-term refinancing operations in May and June 2010.	•			•								•	
2010, June	The European Council agrees to implement the "European Semester" on 1 January 2011. The European Semester comprises a timetable that applies to all elements of surveillance, including fiscal, macroeconomic and structural policies.	•			•									
2010, July	91 European banks undergo stress tests to assess their resilience to economic shocks. All but 7 pass the tests.									•	•			
2010, July	Passing of the US Dodd-Frank Wall Street Reform and Consumer Protection Act.					•					•			
2010, September	Basel III published.							•	•					
2010, October	IMF Board approves far-reaching reforms of the way IMF is run. The core of the reform is a doubling of IMF quotas that produces a shift of 6 percent of quota shares and voting power to emerging market and developing countries.	•												
2010, October 18	French President Nicolas Sarkozy and German Chancellor Angela Merkel meet in Deauville, France and agree on a Treaty change to create a permanent crisis resolution mechanism (the future ESM) which will also provide for the possibility of sovereign debt restructuring.	•											•	
2010, November 17	Council Regulation (EU) No.1096/2010 conferring specific tasks upon the European Central Bank concerning the functioning of the European Systemic Risk Board.			•					•				•	

Date	Event	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8	Ch.9	Ch.10	Ch.11	Ch.12	Ch.13
2010, November 24	Regulation (EU) No.1092/2010 on European Union macro-prudential oversight of the financial system and establishing a European Systemic Risk Board, Regulation (EU) No.1093/2010 establishing a European Supervisory Authority (European Banking Authority), amending Decision No.716/2009 and repealing Commission Decision 2009/78/EC. Regulation (EU) No.1095/2010 establishing a European Supervisory Authority (European Securities and Markets Authority), amending Decision No. 716/2009/EC and repealing Commission Decision 2009/77/EC.	•							•				•	
2010, November 24	Directive (2010/73/EC) amending directives (2003/71/EC) on the prospectus to be published when securities are offered to the public or admitted for trading and (2004/109/EC) on the harmonisation of transparency requirements in relation to information about issuers whose securities are admitted to trading on a regulated market.					•	•						•	
2010, November 28	European leaders and the IMF agree to grant a EUR 85 billion assistance package to Ireland.												•	
2010, December	The European Council agrees on a Treaty amendment to allow a permanent crisis management framework – named the European Stability Mechanism (ESM) – to be established by the euro area countries.	•			•								•	
2011, January	Estonia adopts the Euro.	•												
2011, January	Three new European financial supervisory authorities begin operating: the European Banking Authority, the European Insurance and Occupation Pensions Authority and the European Securities and Markets Authority.							•	•					
2011, January	The first "European Semester" gets under way – a 6 month cycle of economic policy coordination between EU countries.	•			•								•	
2011, March	Euro Plus Pact set up to reinforce economic policy coordination between EU countries.	•			•									
2011, March	Fitch, Moody's and Standard and Poor's downgrade Portugal's sovereign credit rating.												•	
2011, May	The European Council agrees on a financial assistance package totalling EUR 78 billion to Portugal.												•	
2011, July	Treaty establishing the European Stability Mechanism signed. Able to lend EUR 500 billion to euro area countries in crisis.	•			•								•	
2011, July	Euro area leaders agree on new support measures for Greece amounting to EUR 109 billion.	•			•								•	
2011, August	The ECB reactivates secondary market purchases and starts purchasing Italian and Spanish government bonds.				•								•	
2011, August	Standard and Poor's downgrades United States' sovereign credit rating.				•								•	
2011, September	President of the EU Commission proposes a tax on financial transactions.					•	•							
2011, September 6	The Swiss Central Bank announces its decision to cap the Swiss Franc's Euro exchange rate.	•			•									
2011, September 7	The German Constitutional Court in Karlsruhe rules that the rescue packages agreed so far do not go against the German Constitution.				•								•	
2011, September 19	Standard and Poor's downgrades Italy's sovereign rating.												•	
2011, October 27	European leaders agree on a 50% discount on Greek debt held by private investors.												•	
2011, October	Dexia Bank (Belgium) Crisis.												•	

Date	Event	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8	Ch.9	Ch.10	Ch.11	Ch.12	Ch.13
2011, November	Agreement at a G20 Summit on determined and coordinated action for global economic recovery and job creation and steps on financial reform.		•				•			•				
2011, November	The Commission presents a four-part package of measures to deepen EU and euro area economic governance.	•			•		•						•	
2011, December	European Fiscal Compact adopted.	•			•									
2012, January	New treaty on stability, coordination and governance in the EMU agreed by the EU countries except the Czech Republic and UK.	•			•		•						•	
2012, February	A treaty to create a European Stability Mechanism (ESM) is signed. Based in Luxembourg this institution will support euro area countries when necessary to safeguard financial stability.	•			•								•	
2012, February 24	European Securities and Market Authority (ESMA) issues guidelines – systems and controls in an automated trading environment for trading platforms, investment firms and competent authorities.					•								
2012, March	The Eurogroup increases the overall ceiling for EFSF/ESM lending to EUR 700 bn.	•											•	
2012, April	The IMF receives USD 430 bn in pledges from IMF member countries to increase its resources during the spring meetings in Washington.	•												
2012, June	The EU Heads of States and Governments extend the mandate for the permanent facility ESM to include direct re-capitalisation of banks in the euro area, when a common European bank supervisory authority involving ECB has been established.	•			•				•	•	•		•	
2012, July	The ECB Governing Council decides not to accept debt instruments issued or guaranteed by the Greek Government as collateral.				•								•	
2012, July 6	ECB announces implementation of loan-level data reporting requirements for asset-backed securities.									•		•		
2012, July 26	ECB President Mario Draghi says that the ECB, within its mandate, will do “whatever it takes to preserve the Euro”.	•		•	•								•	
2012, September	The ECB Governing Council decides on the modalities for undertaking Outright Monetary Transactions (OMTs) in secondary markets for sovereign bonds in the euro area.				•								•	
2012, September	The European Commission publishes a proposal for a Bank Union including common rules, bank supervision, deposit guarantee and resolution regime.							•	•				•	
2012, October 8	The European Stability Mechanism (ESM) enters into force.	•			•									•
2012, October 25	Statement by European Commission, ECB and IMF on review mission to Ireland.												•	
2012, October 26	Adoption by the European Parliament of Commission proposal for a Directive on markets in financial instruments, repealing Directive (2004/39/EC) – (MiFID II).					•	•							
2012, November 28	Alert Mechanism Report from the EU Commission COM (2012) 751 final.			•	•								•	
2012, December 13	Agreement in the EU Council on the first elements of a European Banking Union and agreement to start the implementation of the Single Supervisory Mechanism (SSM).								•				•	
2012, December 14	Survey of the Implementation of the Basel III framework.							•	•					
2012, December 19	ECB reinstates Greek bonds as collateral.				•								•	

Date	Event	Ch.1	Ch.2	Ch.3	Ch.4	Ch.5	Ch.6	Ch.7	Ch.8	Ch.9	Ch.10	Ch.11	Ch.12	Ch.13
2012, December 20	Recommendation of the European Systemic Risk Board on funding of credit institutions.							•		•			•	
2013, January	Bank of Japan increased its inflation target to 2% per annum and increases the money supply through extensive purchases of bonds in the market.				•									
2013, January 6	Group of Governors and Heads of Supervision endorses revised liquidity standard for banks.							•	•	•				
2013, January 9	Principles for effective risk data aggregation and risk reporting issued by the Basel Committee.							•						
2013, February 4	Statement by European Commission and ECB on second review of financial assistance program for Spain.												•	
2013, February 8	ECB welcomes the European Commission's intention to regulate systemically important reference rates.			•				•						
2013, February 14	The European Commission proposes a Council Directive on a Financial Transaction Tax.									•	•			
2013, March	Cyprus Crisis. The government proposes cuts of bank deposits above EUR 100,000 and temporary limits on bank withdrawals.												•	
2013, March	EU's Ministers of Economic Affairs and Finance agree on common rules to strengthen regulation of credit institutions in the EU (CRD IV/CRR)							•						
2013, March 15	Statement by European Commission, ECB and IMF on review mission to Portugal.												•	
2013, March 19	Basel III monitoring results published by the Basel Committee.							•						
2013, March 19	EU Council and the European Parliament agreement conferring specific tasks concerning supervision of credit institutions on ECB (Single Supervision Mechanism, SSM).							•	•					
2013, April 10	EU Commission Communication on the prevention and correction of macroeconomic imbalances, COM(2013) 199 final.		•	•										
2013, April 17	Implementation of Principles for financial market infrastructures (PFMIs) started by IOSCO and the Committee on Payment and Settlement Systems.					•		•	•					
2013, April 17	Review of Progress Toward Implementation of the 2010 Quota and Governance Reform of IMF published.	•												
2013, May 31	ECB welcomes the introduction of separate EONIA and EURIBOR panels and encourages banks' participation.			•										
2013, June 18	NYSE Euronext publishes a compliance update for member exchanges.					•								
2013, June 19	Statement by the IMF, EC, and ECB on the Greek Review Mission.	•			•		•						•	
2013, June 25	Single Portal on EU finance expanded to include EU Structural Funds.									•	•			
2013, June 26	The Basel Committee releases proposals for international leverage ratio and associated disclosure requirements.							•						
2013, June 26	Agreement between the EU Council and the European Parliament on European rules on market abuse (MIFID 2)					•				•	•			
2013, June 27	The EU Council agrees on a Directive establishing a framework for the recovery and resolution of credit institutions and investment firms (11148/1/13 REV1)							•	•				•	
2013, July 1	Croatia becomes the 28th Member State of the European Union						•							

List of Currency Codes

AUD	Australian Dollar
BRL	Brazilian real
CAD	Canadian Dollar
CHF	Swiss Franc
CNY	see RMB
DKK	Danish Krone
EUR	Euro
GBP	British Pound (sterling)
INR	Indian rupee
JPY	Japanese Yen
KRW	Korean won
NOK	Norwegian Krone
RMB	Chinese Yuan (Renmimbi)
SDR	Special Drawing Rights
SEK	Swedish Krone
USD	US Dollar

Pre-Euro Legacy Currencies

ATS	Austrian Schilling
BEF	Belgian Franc
DEM	Deutsche Mark
ESP	Spanish Peseta
FIM	Finnish Markka
FFR	French Franc
GRD	Greek Drachma
IEP	Irish Punt
ITL	Italian Lire
NLG	Dutch Guilder
PTE	Portuguese Escudo

ECU	European Currency Unit

List of Figures

List of Tables

List of Abbreviations

ABS	asset-backed securities
AME	advanced market economies
ATM	automated teller machine
BAC	Banking Advisory Committee
BCBS	Basel Committee on Banking Supervision (fomerly Basel Committee on Banking Regulation and Supervisory Practices)
BEQB	Bank of England Quarterly Bulletin
BIS	Bank for International Settlements; less frequently Department of Business, Innovations & Skills (UK)
BPN	Banco Português de Negócios
BRICS	Brazil, Russia, India, China and South Africa
B-VAR	Bayesian vector autoregression (model)
C20	Committee of Twenty
CAR	capital adequacy requirements
CBPP	Covered Bonds Purchase Programme (CBPP and CBPP2 being separate rounds)
CCI	Convergence and Competitiveness Instrument
CDO	Collateralised Debt Obligation
CDO^2	CDO of CDOs (CDO-squared)
CDS	Credit Default Swap
CDX-HY	CDX High Yield Index
CDX-IG	CDX Investment Grade Index
CEE	Central and Eastern Europe(an)
CEO	Chief Executive Officer
CEPS	Centre for European Policy Studies
CFO	Chief Financial Officer
CFTC	Commodity Futures Trading Commission
CIP	Covered Interest Parity
CMO	Collateralised Mortgage Obligation
CoCo	Contingent Convertible (bonds)
CoG	Committee of Central Bank Governors
CPI	Consumer Price Index
CRAs	credit rating agencies
DJ-UBS	Dow Jones-UBS Commodity Index
DSGE	Dynamic Stochastic General Equilibrium (models)
DRI	DRI Model of the U.S. Economy
DTD	distance-to-default
EBA	European Banking Authority
EC	European Commission

ECB	European Central Bank
ECOFIN	Economic and Financial Affairs Council
ECS	Enhanced Credit Support
EDP	Excessive Deficit Procedure
EEC	European Economic Community
EFSF	European Financial Stability Facility
EFTPOS	electronic funds transfer at the point of sale
EIB	European Investment Bank
EIP	excessive imbalance procedure
EMCF	European Monetary Cooperation Fund
EME	emerging market economies
EMF	European Monetary Fund
EMS	European Monetary System
EMU	European Monetary Union
EONIA	Euro OverNight Index Average
ESFS	European System of Financial Supervisors
ESM	European Stability Mechanism
ESRB	European Systemic Risk Board
ETF	exchange-traded funds
EURIBOR	Euro Interbank Offered Rate
EuroTRX	European Trade Receivables Exchange
Fannie Mae	Federal National Mortgage Association
FDI	Foreign Direct Investment
FDIC	Federal Deposit Insurance Corporation
Fed	US Federal Reserve System
FHLB	Federal Home Loan Banks
FOMC	Federal Open Market Committee
FRBNY	Federal Reserve Bank of New York
Freddie Mac	Federal Home Loan Mortgage Corporation
FSAP	Financial Services Action Plan
FSB	Financial Stability Board
FSF	Financial Stability Forum
G5	Group of Five
G6	Group of Six
G7	Group of Seven
G10	Group of Ten
G20	Group of Twenty Finance Ministers and Central Bank Governors
GAB	General Arrangements to Borrow
GATT	Global Agreement on Tariffs and Trade
GDP	Gross domestic product
GFSR	Global Financial Stability Report

GMV	Gross market value
GSCI	Goldman Sachs Commodities Index
GSIFI	globally significant financial institutions
HBoS	Halifax Bank of Scotland
HICP	Harmonised Index of Consumer Prices
IAIS	International Association of Insurance Supervisors
ICT	Information and Communications Technology
IET	Interest equalisation tax
IIF	Institute of International Finance
IKB	IKB Deutsche Industriebank
IMF	International Monetary Fund
INET	Institute for New Economic Thinking
ING	Internationale Nederlanden Groep
IOSCO	International Organization of Securities Commissions
IRS	Interest Rate Swaps
IS/LM	Investment-Saving / Liquidity preference-Money supply (model)
IT	Inflation Targeting
iTraxx	iTraxx credit default swap (CDS) index
LCR	Liquidity Coverage Ratio
LIBOR	London Interbank Offered Rates
LTCM	Long Term Capital Management
LTRO	Long-term refinancing operations
LTV	Loan-to-value
M&A	mergers and acquisitions
MBS	Mortgage-backed securities
MCI	Monetary Conditions
MIP	Macroeconomic Imbalance Procedure
MPS	marginal propensity to save
MRO	Main Refinancing Operations
MTO	medium-term budgetary objective
NAEC	New Approaches to Economic Challenges
NAFTA	North American Free Trade Association
NAIRU	Non Accelerating Inflation Rate of Unemployment
NAMA	National Asset Management Agency (Ireland)
NDF	Non-Deliverable Forward (market)
NFBL	negative-feed-back-loop
NPL	non-performing loan
NSFR	Net Stable Funding Ratio
NYSE	New York Stock Exchange
O&D	originate and distribute (business model)
OCA	Optimum Currency Area
OCC	Office of the Comptroller of the Currency

OECD	Organisation for Economic Co-operation and Development
OIS	Overnight Index Swaps
OMT	Outright Monetary Transcations
OPEC	Organization of the Petroleum Exporting Countries
OTC	over-the-counter
PD	probability of default
PFI	private finance initiative
RBI	Reserve Bank of India
RBS	Royal Bank of Scotland
RDX1	RDX1, Bank of Canada model
RDX2	RDX2, Bank of Canada model
RE	Rational Expectations
RMBS	residential mortgage-backed securities
RoE or ROE	return on equity
RWA	risk-weighted assets
SAFE	State Administration of Foreign Exchange (China)
SAREB	Sociedad de Gestión de Activos Procedentes de la Reestructuración Bancaria (bad bank)
SDR	Special Drawing Rights
S&Ls	Savings and Loans
SEC	US Securities and Exchange Commission
SEIR	Structured early intervention resolution
SGP	Stability & Growth Pact
S-I	saving-investment (correlation)
SIFMA	Securities Industry and Financial Markets Association
SIVs	structured investment vehicles
SME	Small to Medium-sized Enterprise
SMP	Securities Market Programme
SPGSCI	Standard & Poor's and Goldman Sachs Commodities Index
SPVs	special purpose vehicles
SSM	Single Supervisory Mechanism
SVAR	structural vector autoregressive (model)
TARGET2	Trans-European Automated Real-time Gross Settlement Express Transfer System
TBTF	too-big-to-fail
TSB	Trustees Savings Bank
UIP	Uncovered Interest Parity
UK	United Kingdom
USA	United States of America
VaR	Value at Risk
VAR	vector autoregression (model)
VFCR	Voluntary foreign credit restraint

VIX	Chicago Board Options Exchange Volatility Index
WTI	West Texas Intermediate
WTO	World Trade Organization
WWII	World War II
Y2K	Year 2000 problem
ZLB	Zero Lower Bound

INDEX

A

B

C

D

E

F

G

H

I

J

K

L

M

N

O

P

Q

R

S

T

U

V

W

X

Z

SUERF – Société Universitaire Européenne de Recherches Financières

SUERF is incorporated in France as a non-profit-making Association. It was founded in 1963 as a European-wide forum with the aim of bringing together professionals from both the practitioner and academic sides of finance who have an interest in the working of financial markets, institutions and systems, and the conduct of monetary and regulatory policy. SUERF is a network association of central bankers, bankers and other practitioners in the financial sector, and academics with the purpose of analysing and understanding European financial markets, institutions and systems, and the conduct of regulation and monetary policy. It organises regular Colloquia, lectures and seminars and each year publishes several analytical studies in the form of *SUERF Studies*.

SUERF has its full-time permanent Executive Office and Secretariat located at the Austrian National Bank in Vienna. It is financed by annual corporate, personal and academic institution membership fees. Corporate membership currently includes major European financial institutions and Central Banks. SUERF is strongly supported by Central Banks in Europe and its membership comprises most of Europe's Central Banks (including the Bank for International Settlements and the European Central Bank), banks, other financial institutions and academics.

SUERF Studies

1997-2011

For details of *SUERF Studies* published prior to 2012 (Nos. 1 to 22 and 2003/1-2011/5) please consult the SUERF website at www.suerf.org/suerfstudies.

2012

2012/1 *New Paradigms in Monetary Theory and Policy?*, edited by Morten Balling and David T. Llewellyn, Vienna 2012, ISBN 978-3-9021-0961-3

2012/2 *New Paradigms in Banking, Financial Markets and Regulations?*, edited by Morten Balling, Frank Lierman, Freddy Van den Spiegel, Rym Ayadi and David T. Llewellyn, Vienna 2012, ISBN 978-3-9021-62-0

2012/3 *Future Risks and Fragilities for Financial Stability*, edited by David T. Llewellyn and Richard Reid, Vienna 2012, ISBN 978-3-9021-0963-7

2012/4 *The ESRB at 1*, edited by Ernest Gnan, Stefan Gerlach and Jens Ulbrich, Vienna, 2012, ISBN 978-3-9021-0964-4

2012/5 *Developing Distress Resolution Procedures for Financial Institutions*, Clas Wihlborg, Vienna 2012, ISBN 978-3-9021-0965-1

2013

2013/1 *The Interaction of Political, Fiscal and Financial Stability: Lessons from the Crisis*, edited by Ernest Gnan, Vienna 2013, ISBN 978-3-902109-66-8

2013/2 *States, Banks and the Financing of the Economy: Fiscal Policy and Sovereign Risk Perspectives*, edited by Morten Balling, Peter Egger and Ernest Gnan, Vienna 2013, ISBN 978-3-902109-67-5

2013/3 *States, Banks and the Financing of the Economy: Monetary Policy and Regulatory Perspectives*, edited by Morten Balling, Ernest Gnan and Patricia Jackson, Vienna 2013, ISBN 978-3-902109-68-2