New Paradigms in Banking, Financial Markets and Regulation?

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1.   INTRODUCTION

Morten Balling, Frank Lierman, Freddy Van den Spiegel,
Rym Ayadi & David T. Llewellyn

On May 11-12, 2011, SUERF, the Belgian Financial Forum, the Brussels Finance Institute and the Centre for European Policy Studies (CEPS) jointly organised the 29th SUERF Colloquium *New paradigms in money and finance?* The papers included in this SUERF Study are based on contributions to the Colloquium. The 2008-11 financial crisis has demonstrated unsatisfactory performance in financial institutions and in financial regulation and supervision all over the world. The contributors to the present volume look with critical eyes on financial theories, supervisory structures, (mis)pricing of risk and distorted incentives, risk management models and procedures, conflicts of interest and bank strategies. Their perspectives are quite different, but they share the ambition of finding improved analytical, organizational or managerial approaches so that decision-makers have a better chance of showing good performance in the future. In essence, they are looking for new paradigms in banking, financial markets and regulation.

In Chapter 2, "Financial supervision in Europe after the crisis", *Martin Merlin,* Head of the Financial Services Policy Unit, European Commission, gives an overview of the development of financial supervision in Europe. We have seen a move from a situation where national supervisors focussed essentially on national issues, while financial markets were becoming increasingly integrated. It became evident that you cannot have integration and stability at a regional level if national supervisors remain fully in charge, and if their only mandate is to cater for the protection of national consumers and for financial stability at the national level. There was no adequate macro prudential supervision, no macro prudential supervision in Europe, none in the US and none internationally. Early warning mechanisms were ineffective. It is against this background that it was decided to create four new bodies in Europe: the European Systemic Risk Board based in Frankfurt, and three European Supervisory authorities for Banking, Securities and Markets and Occupational Insurance and Pensions – based in London, Paris and Frankfurt respectively. The new supervisory authorities and new crisis management and resolution packages must of course be seen in a broader global context. The Basel 3 Accord points to more transparency and more responsibility. The European tax payers cannot afford another round of bank failures and we owe it to them to prevent that from happening again. This is best achieved by introducing more European coordination and cooperation, not less.

Chapter 3, "The economic crisis: a story of supervisory failure and ideas for the way forward" by *Donato Masciandaro,* Bocconi University, *Marc Quintyn,* IMF Institute, and *Rosaria Vega-Pansini,* Bocconi University, contains a detailed description of the failures in many supervisory systems in the run-up to the recent financial crisis. The authors give a systematic analysis of the impact of two key features of the supervisory architecture – consolidation and quality of governance – and come to the conclusion that both were negatively correlated with economic resilience. Also central bank involvement in supervision did not seem to matter. After pointing out the limitations of the governance arrangements and using a new distinction between macro and micro prudential surveillance, the authors suggest that supervision be assigned to two separate institutions (macro vs. micro) rather than a single integrated agency so that checks and balances, as a complement to governance, rather than consolidation, can assist in reducing the possibility of failure.

In Chapter 4, "Systemic changes in the financial world and the search for the new paradigm of finance", *Adam Szyszka,* Poznan University of Economics, confronts traditional neoclassical financial economics with behavioural finance focusing on the key assumptions, predictions, and findings of each of these schools of thought. After several turbulent years in global financial markets, it has been asked if the traditional paradigms of economics – and within it, the neoclassical theory of finance – adequately describe economic reality and events occurring in the financial world. In contrast to traditional theory, behavioural finance assumes that agents may be irrational in their reactions to new information and invest-ment decisions. People make mistakes, they may have unstable preferences and they may have changing emotions and moods. Noise traders risk may disturb arbitrage. Financial markets are not always efficient. Market regulators must take into account the possibility of irrational behaviour. Investors may suffer from overconfidence and unrealistic optimism. According to the author, there is a need for an interdisciplinary approach where the neoclassical paradigm might be seen as an idealised normative benchmark, while behavioural finance may help to explain deviations from this benchmark, showing how psychological biases may cause irrational behaviour of investors.

In Chapter 5, "Basel regulation and banks' incentives", *Rym Ayadi*, Centre for European Policy Studies (CEPS), provides a critical assessment of the evolution of the Basel Committee's role and of the rules it has produced over the years. The Basel I, Basel II and Basel III accords have impacted banks' incentives all over the world in recent decades. In her conclusion, she offers some proposals for improvements.

In Chapter 6, "Perfect models, fallible humans?", *Frank de Jonghe,* Ghent University, describes the development, problems and use of internal mathematical models designed to support risk management in financial institutions. Data that feed such models should ideally be current, accurate and complete. In practice, data may be missing in the source systems or may be erroneous. Data cleaning by means of correction rules may, however, introduce bias in the results of the model. Model development is subject to key-person risk in the sense that only a few model developers completely understand the assumptions and the technical platform. Managers may use the model for an unintended purpose due to insufficient understanding of the strengths and weaknesses of the model. So-called user tests should be crucial ingredients for having the internal models accepted for calculating and reporting regulatory capital requirements. People involved in the assessment of model risk and model validation may suffer from cognitive biases in different forms. Confirmation bias is the tendency to look for information that confirms your preconceptions. Mental anchoring means that there is a tendency to take arbitrary reference points or values in decisions involving numbers, even when they may not be relevant for the actual decision. Clustering illusion is the human tendency to detect patterns in a priori purely randomly generated series of data. The role of models depends on the mathematical literacy of the decision makers in a financial institution. In insurance companies, mathematically trained actuaries often reach the highest levels in the organisation and this may lead to a more supportive attitude towards the role of models in decision making. In his conclusion, the author warns the reader that the described problems in modelling practice should not be understood as a justification to ignore mathematical models entirely. The process of model construction enforces a minimum degree of logical consistency in thinking about risk.

In Chapter 7, "The cooperative banking model: performance and opportunities" *Hans Groeneveld,* Rabobank Nederland, documents that European cooperative banking groups have escaped relatively unscathed from the financial crisis and that they did not need large-scale government support. The author looks for possible explanations of their relatively good performance and achievements. One of the explanations seems to be their corporate governance structure. They are owned by members, who have beneficial influence on managers. Partly due to this influence, the banks have consistently focussed on providing traditional bank services at competitive prices and efforts to improve the efficiency of operations have been stressed. The cooperative banks aim to be well-capitalised and to have moderate risk profiles.

In Chapter 8, "Competition on the Polish banking market (before the financial crisis and during the crisis) – empirical results", *Malgorzata Pawlowska,* National Bank of Poland, estimates the level of competition in the Polish banking

sector in 1997-2009 with the use of quantitative methods based on the theory of competition measurement in the banking sector. She applies three models: the Panzar and Rosse model, the Lerner Index model and Boone's model. In most of the period, commercial banks in Poland operated in an environment of monopolistic competition. All models demonstrate a strong increase in competition between 1999-2004 caused by Poland's accession to the EU and a slight decrease in competition in 2008-09 caused by the financial crisis.

In Chapter 9, "The revisited concept of bank liquidity in the theory of bank intermediation", *Emil Slazak,* Warsaw School of Economics, studies the various aspects of the concept of liquidity in banking under asymmetric information. The author explains why banks are becoming more prone to highly volatile idiosyncratic liquidity shocks. Traditionally, funding liquidity refers to the liability side of the bank's balance sheet. Banks are assumed to fund themselves by taking deposits from interbank operations and central bank operations. The recent crisis meant that interbank markets broke down and materialised funding risks. A contamination process caused illiquidity of many banks and created need for bail-outs. Central banks intervened on a large scale. There is a need to rethink bank intermediation theory.

In Chapter 10, "An alternative way of calculating pragmatic risk-based premiums", *Susanna Walter* and *Matthias Schaller,* Swiss Institute of Banking and Finance, University of St. Gallen analyse deposit insurance schemes. During the crisis, deposit insurance schemes managed to prevent bank-runs apart from minor exceptions. Such schemes do, however, involve moral hazard. Risk-adjusted premiums can partially mitigate the incentives for banks to increase leverage and the disincentives for bank customers to monitor their banks. The two authors introduce a Merton-based calculation of deposit insurance premiums. They measure bank risk based on the Basel 2 and Basel 3 frameworks using capitalization and liquidity as major approximations for bank stability. They argue that their empirical evidence provides support for the view that Basel 3 capital requirements are too low.

In Chapter 11, "Conflicts of interest in investment advice to private customers – A call for greater transparency and better alignment of interests", *Peter Reedtz,* Asset Allocation Institutet, looks at the concept of impartiality and ways of avoiding the classic conflicts of interest between the adviser and the client. As elements in the provision of poor investment advice, the author distinguishes between professional incompetence, inadequate risk assessment, lack of impartiality and dishonesty. The chapter focuses on the lack of impartiality in the provision of investment advice to private clients. Impartial advice means that the adviser takes only the client's interests into account and is not influenced by fac-

tors such as his or her own earnings or a desire to sell a certain product. In practice, few private client advisers meet the requirements for pure, impartial advice. Performance-related forms of payment are often problematic and far from consistent with the principle of pure impartiality. Possible solutions for improving the situation are: general education and informing of clients, improved information on products and services, certification of advisers, product restrictions, mandatory ethical standards and new forms of remuneration. According to the author, the solution lies in a combination of several initiatives. He concludes that it is realistic to achieve a considerably higher degree of impartiality and quality in the provision of investment advice to private clients.

Chapter 12, "Views on bank strategy and capital market infrastructure" contains contributions by *Lars Machenil,* BNP Paribas Fortis and *Lieve Mostrey,* Euroclear. Lars Machenil describes how BNP Paribas Fortis in Belgium and Luxembourg organised an exit from non-core business and geographical areas. The bank decided to divest many activities which were no longer considered to be core business. The strategic decision to exit from non core business and some geographic areas within eighteen months was linked to a refocus on the core mission: being a universal bank in Belgium and Luxembourg with reinforced commercial banking networks. Valuation and cut-off dates had to be handled carefully. Lieve Mostrey describes in a diagram the roles of different layers of market infrastructure in the international capital market value chain. The first layer is trading, where orders are negotiated and agreed. The second layer is composed of clearing activities, where a central counterparty stands between the different trading counterparties. The third layer is settlement, where the securities and cash are actually exchanged by firms such as Euroclear. Risk management is critical. Consequently, Euroclear has to operate in a very safe way. Almost all clients have to provide full collateralisation. The risk mitigation process and asset protection approach have worked very well. Euroclear is therefore considered to be a safe haven. The market infrastructure has proved its robustness in turbulent times.

2. FINANCIAL SUPERVISION IN EUROPE AFTER THE CRISIS

Martin Merlin

If there is one area where after the crisis in Europe we definitely need a paradigm shift, it is in the area of financial supervision. What was the paradigm prevailing before the crisis? We had fully independent national supervisors focusing essentially on national issues, national concerns, with some loose coordination of their activities at European level. We already had fairly integrated markets, especially wholesale markets, but we were trying even further to integrate these markets and of course we wanted to maintain stable financial markets. This was the paradigm and we realise now that this was not tenable. This paradigm has been portrayed by some as being the fundamental trilemma of financial supervision, and we came to the conclusion that we had to leave aside one of the three elements. Integrated and stable financial markets can go hand in hand, and even though it is quite a challenging task to make sure that this is the case, it is nevertheless possible, and you do not need a trail between integration and stability as long as you have adequate cross border financial stability arrangements in place. That is what we are now trying to build in Europe. You cannot have integration and stability at a regional level if national supervisors remain fully in charge and if their only mandate is to cater for the protection of national consumers and for financial stability at national level. We now all agree that there is no such thing as national financial stability anymore. Financial stability has to be international or it has to be at least regional.

The UK's Financial Services Authority in its post-crisis Turner Review[1] has underlined very well the need for a paradigm shift and states the need for *more European coordination or more national powers, more or less Europe, but in any instance not allowing the system to stay as it was.* So it should not be a surprise that the Commission has opted for more Europe – and luckily the EU Council of Minister and the European Parliament have followed us in this direction. If we look at financial supervision, what are the lessons from the crisis and what went wrong? Firstly there was no adequate macro-prudential supervision, no macro prudential supervision in Europe, none in the US and none internationally. Nobody was examining the interaction between macroeconomic developments, monetary developments in particular, and developments within financial institutions from a prudential standpoint. Early warning mechanisms were ineffective. If you look at some IMF reports produced between 2004 and 2007, or at the work of some academics, you do see that in some cases people were pointing to

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[1]   *Financial Services Authority*, 2009, "The Turner Review: A regulatory response to the global banking crisis".

the risks that were building up in the system. People were talking about the risks inherent in the securitisation process, and people were worried about the transfer of risks from one financial sector to another. However, there was no mechanism in place to make sure that these early warnings were translated into recommendations to address the risks that had been anticipated. Consequently these early warnings remained unheard. We failed in Europe to challenge supervisory practices on a cross-border basis, so national supervisors were sat in a cosy corner doing whatever they felt was appropriate for their national financial systems. In some Member States we have witnessed that there have been major failings in the supervision of national financial institutions and cross-border financial institutions. We had a lack of frankness and cooperation between supervisors, difficulties in exchanging information between supervisors, even in normal circumstances, let alone in prevailing crisis situations. We had almost no resources devoted to European coordination of financial supervision, and while we had three advisory committees to the Commission, they were not properly staffed: finally, and this is probably the most important point, we had no means for financial supervisors to take common decisions, European decisions regarding European problems. Wholesale markets, especially as some of their segments are highly integrated, *e.g.* the banking and insurance markets which are both dominated by a few pan-European groups that hold something like 70% of banking and insurance assets. In spite of this high level of integration it was impossible to take a European legally-binding decision pertaining to wholesale markets or to cross-border banks and cross-border insurance companies. I think it would be exaggerated to say that this mismatch between integrated markets and national supervision has been a major cause of the crisis; but while it certainly did not help before the crisis and during the crisis, however, we would definitely want to avoid that this mismatch becomes a source of a crisis in the future. And that is why policy makers in Europe have decided to try and put some order into the European house for financial supervision.

What have we agreed upon? We have agreed on the creation of four new bodies in Europe: the European Systemic Risk Board based in Frankfurt; and three European supervisory authorities for Banking, Securities and Markets and Occupational Insurance and Pensions – based in London, Paris and Frankfurt respectively. I would like to say a few words about the European Supervisory Authorities (ESAs). It is very important to bear in mind that their role is not to replace national supervisors. National supervisors remain competent for the supervision of the financial institutions established in their territories, but these national supervisors will now have to work in tandem with the new European supervisory authorities to safeguard financial soundness at the level of individual financial firms. We are trying to build a European network with the ESAs at the centre of the network and with strong coordination at European level, so that we have

harmonised rules as well as coherent supervisory practices and enforcement in a single market.

The new European supervisory authorities will have the power to draw up technical rules that then will be transformed into law and addressed either to national supervisors or to financial institutions. They will be able to take action in crisis situations, with coordinated action between national supervisors, something which has been clearly been missing during the crisis – in particular, remembering the Deposit Guarantee Schemes (DGS) or short selling episodes. The European supervisory authorities will be able to mediate and settle disputes in a legally-binding way between national supervisors when such disputes arise, and they do. The new authorities will also be there to assist the Commission in ensuring the correct and consistent application of European law and, in particular, of European prudential legislation; and, they will have the capacity to address legally-binding decisions to national supervisors. If national supervisors do not comply with these decisions they will have, on the basis of European regulations, the power to address legally-binging decisions directly to financial institutions, which is quite a breakthrough for Europe. In addition, since 1st January 2011, we have established a European Systemic Risk Board in order to monitor and assess potential threats to financial stability that arise from macroeconomic developments and from within the financial system as a whole, that is macro prudential supervisory issues. The ESRB will provide an early warning of system-wide risks that may be building up and, where necessary, issue recommendations for actions to deal with these risks. The new European supervisory authorities and the ESRB are now up and running, so we hope that they will reach their cruising speed very quickly.

They have the potential, we believe, to make a real difference through their contribution to a safer, sounder, and more financially-responsible system, but they will have a challenging task. The main challenge that we see is that these are European bodies with a legal personality created by Council and Parliament, but they are composed of national supervisors and national central banks (NCBs). So the question is, will national supervisors, for example, be able to take off their national 'hat' when they enter the European authorities in order to take decisions that are adequate for the European interest? We will have to see. That will largely depend on the Chairs of the new authorities and on their staff, as well as on the European spirit of their members. Will this new system be enough and is it going to work? Frankly, we do not know, although we are very confident that it will make a major difference in comparison to the pre-crisis situation. The ball is firmly in the court of the supervisors and the governors of the 27 central banks of the EU member states and of the ECB, and we will take stock after three years of operation with a review planned for 2014 of how the system works. We have no pre-conceived ideas in relation to this review, and the Commission really

wants the new system to succeed; but, if it happens not to work and if it doesn't deliver European solutions to European problems, then we will need to be able to draw the lessons from that.

Until now, I have mainly spoken about crisis prevention and I think we are putting a more robust system in place in Europe to prevent crises in the future; but of course, crises can still occur, and they will occur, and therefore we also need a better system to manage and resolve crises. We need a system to deal with bank failures in particular, in an orderly fashion. And here I would like to quote another distinguished British regulator, the Deputy Governor of the Bank of England, Paul Tucker, who remarked in an interview in January 2011, "*If we have a system where banks take the upside but the taxpayer takes the downside something has gone wrong with capitalism, with the very heart of capitalism, and we need to repair this. Capitalism can't work unless these financial firms at the centre of the heart of capitalism can be subject to orderly failure. The rules of capitalism need to apply to them just as they do to non-financial companies.*" And indeed, currently in Europe, and here we are lagging far behind in comparison to the US, if a bank fails unexpectedly, it can hold a government to ransom over a weekend and insist on a bail-out to prevent market chaos and panic on Monday morning. We have seen that happening on many occasions.

So the key to preventing this is, of course, close monitoring, active and intrusive supervision, appropriate rules, and also early intervention powers for supervisors. Banks must prepare themselves for the event of a failure and supervisors must be prepared for them to fail. We need recovery and resolution plans and we are also looking at the issue of bail-in, despite many technical and legal issues involved there. We will table a quite ambitious legislative proposal on crisis management and crisis resolution whereby we want to give supervisors adequate tools and powers to intervene along a continuum that ranges from early intervention when a bank first encounters difficulties and that goes into more intrusive supervision when these difficulties are of greater concern; and, that ends up with the capacity effectively and efficiently to resolve a bank that is no longer viable. We want all competent authorities in Europe to have adequate and consistent tools and powers to manage crises effectively, and we also want them to cooperate better. That is why we will propose to have cross-border resolution colleges for all major cross-border banks and investment firms in Europe.

Let me now conclude. The new supervisory architecture and new crisis management and resolution package must of course be seen in a broader context. Firstly in the G20 context: what we do is very much in line with what the G20 has decided. There needs to be international consistency and that has to be seen in the broader context of the various new rules that are being put in place in Europe in order to have a more solid financial system. These rules that aim at having finan-

cial institutions that are prudentially more solid, hence the movement in Europe towards the Basel III Accord, and the Solvency2 framework for insurance companies. We want also more transparency in the market, hence our rules on credit derivatives markets and in particular over the counter (OTC) derivatives markets, where supervisors need to know what is happening in these markets to be able to respond to the accumulation of risks. We also need more transparency in the way in which hedge funds operate, so that macro prudential oversight can be effective and so that risks of excessive leverage, in particular creating systemic risks, can be detected by supervisors. We also want more responsibility in the financial sector, hence our rules on remuneration practices, so that we have a better balance between the short-term risk-taking and the long term performance of companies. We also want more responsibility on the side of boards of financial institutions. They have to take a more active regarding the oversight of the management of the firms and we will propose legislation on that very soon.

The bottom line is that the European tax payer cannot afford another round of bank failures and we owe it to them to prevent that from happening again, and should ensure a stable financial system while retaining the benefits of the single market. Clearly this is best achieved by introducing more European coordination and cooperation, not less.

3. THE ECONOMIC CRISIS: A STORY OF SUPERVISORY FAILURE AND IDEAS FOR THE WAY FORWARD

Donato Masciandaro, Rosaria Vega-Pansini and Marc Quintyn

3.1. Introduction

In the aftermath of the Asian financial crisis, international financial institutions (IFI), national stakeholders and academia took several initiatives to improve the quality of the regulatory and supervisory framework for finance. It was hoped that a combination of stronger regulatory frameworks and better quality supervision would help to avoid, or at least mitigate the effects of, a possible next crisis. Emerging initiatives, such as the Basel Core Principles for Effective Bank Supervision (BCP), were expedited and new initiatives, such as the IMF-World Bank Financial Sector Assessment Programs or FSAPs, were introduced. In the same period work on the Basel II regulatory framework saw the light of day. These international efforts were complemented by revisions, by several national authorities, of their supervisory architecture in order to enhance the effectiveness of supervision. This wave of revisions was inspired by the unification of all financial supervisors in the Financial Services Authority (FSA) in the UK in 1997. Crisis mitigation brought additional arguments to the table for revising the national supervisory architecture. Finally, work was also undertaken to strengthen governance of supervisory agencies.

Several studies in the pre-2007-crisis years showed some, albeit not conclusive, evidence that the above changes were generating a positive impact on financial sector stability and soundness. So, hope was growing that the improvements in supervisory quality (reflected by a more effective supervisory architecture and good supervisory governance) would foster financial stability.

The financial and economic crisis that started in 2008 was a rude awakening. Supervisory failure was mentioned by several scholars and policymakers as one of the main contributing factors, besides macroeconomic factors, regulatory failures, failures in other parts of the governance of the financial system (such as rating agencies, accounting practices, transparency). However, no systematic analysis of the linkages between the two above mentioned features of supervision and the depth of the crisis has been undertaken[1].

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[1] This paper focuses exclusively on supervision. Supervision concerns the implementation, monitoring and enforcement of the regulatory framework.

So the objective of this paper is twofold. First we will empirically test the impact of supervisory architecture and governance (SAG) on the resilience of the economy to the crisis. Our main finding is that the quality of supervision (degree of unification and supervisory governance) was negatively associated with economic resilience and that the degree of involvement of the central bank in supervision did not have any significant impact on resilience. Second, arriving at the conclusion that supervisory quality is negatively associated with economic resilience, we will review the proposals that so far have been offered for improving the quality of supervision. While certainly valuable, a common weakness of most of them is that they do not really tackle the underlying problem of incentives-misalignment of supervisors. We therefore add our own proposal to the discussion. We argue that conducting supervision through two separate agencies could be a way of introducing checks and balances in the supervisory process which could potentially address the incentives problems in supervision.

The paper is structured as follows. Section II sets out the background. Section III summarizes the empirical evidence on the impact of SAG on financial and economic resilience. Section IV presents a proposal as to how, under the emerging circumstances, architecture can be combined with supervisory governance to better align supervisory incentives. Section V concludes.

3.2.   Background

Since the mid-1990s, international financial institutions (BIS, IMF, World Bank), academics and national authorities have started to pay attention to the quality of supervision, as a complement to the long-standing interest in financial regulation. For the purpose of this paper we define supervisory quality as being composed of two building blocks: supervisory architecture and supervisory governance. At least four broad initiatives were taken to improve the quality of supervision.

- As a first initiative, the *Basel Core Principles for Effective Banking Supervision* (BCP) were issued in 1996 (Basel Committee, 1996), more or less at the eve of the Asian financial crisis. The objective of the BCPs was to promote best practices in the content of the regulatory framework, as well as in bank supervision. Efforts to apply these principles intensified greatly in response to the Asian crisis. This crisis had indeed brought to the surface a number of major flaws in the supervisory process (see Lindgren *et al.*, 1999), in addition to regulatory flaws. Thus, the BCPs (in addition to several other standards and codes) were used for peer reviews as part of the Financial Sector Assessment Program (FSAP) jointly conducted by IMF and World Bank. The principles themselves were subject to a major revision in 2006.

- A second development was the search by national authorities for that *supervisory architecture* that would increase effectiveness and efficiency of the supervisory process as much as possible. Although it was obvious from the start that the supervisory architecture was a second order issue, and that the quality of regulation and supervision were of predominant importance, a great deal of attention went to the architecture. Unifying all sector supervisors under one roof was increasingly considered the most effective solution, given the blurring of demarcation lines between several types of financial institutions and the formation of all-encompassing financial conglomerates (Abrams and Taylor, 2000 and Llewellyn, 2006). The 'reform hype' started in the wake of the establishment of the FSA in UK in 1997. Since then, many countries have reformed their supervisory architecture. As it turned out, not all opted for unification, but several configurations emerged, with varying roles for the central banks in the supervisory process (for an overview, see Masciandaro and Quintyn 2009). Masciandaro and Quintyn (2009) found that before the crisis the trend in the changes in supervisory structures seemed to be characterized by two intertwined features: consolidation (or unification) of supervision goes hand in hand with the specialization of the central bank in pursuing its monetary policy mandate, and vice versa: where several authorities are present, the central bank is likely to be deeply involved in supervision.

- A third development concentrated on identifying principles of *good supervisory governance* in order to withstand the various sources of capture (political, industry and self-capture) that supervisors are facing. Das and Quintyn (2002) and Quintyn (2007) proposed a governance framework consisting of four reinforcing pillars (independence, accountability, transparency and integrity). Further work on supervisory independence (Quintyn and Taylor, 2002) and accountability (Hüpkes, Quintyn and Taylor, 2005) spelled out the necessary operational components of these governance pillars. Ponce (2009) developed a theoretical model showing that supervisory independence had a positive impact on financial sector soundness[2]. The bottom line of the work on governance was that independent supervisors need an elaborate set of accountability arrangements to offset the fact that for financial supervision a very specific contract (in the principal-agent sense) is impossible, given the great range of contingencies that can occur in supervision (see also Schuler, 2003, Majone, 2005 and Dijkstra, 2010).

- Finally, several scholars argued that financial sector governance could benefit from more reliance on *market discipline*, as it would introduce an addi-

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[2] The 2006 BCP revision took on board more elements of operational independence, accountability and transparency as best practices.

tional check on the supervisory process. Calomiris (1999a and 1999b) argued that requiring banks to maintain a minimal proportion of subordinated debt finance would reduce the moral hazard typically created by government safety nets (which include supervision), In the same vein, Barth, Caprio and Levine (2006) argue that the supervisors' incentive structure can never be perfectly aligned, mainly because of political and bureaucratic capture. Therefore, mechanisms and incentives need to be created to foster market discipline as an additional check on the supervisory system *and* on financial institutions governance.

Empirical evidence gathered before the crisis on the impact of these various approaches to enhance SAG on financial sector soundness raised expectations, although not unequivocally so.

On the impact of compliance with BCPs on the soundness of the financial system, Podpiera (2006) showed that higher degrees of BCP compliance have positive effects on the quality of bank assets and also lower the net interest margin. Demirgüç-Kunt, Detragiache, and Tressel (2006) concluded that compliance with those principles that have a bearing on disclosure and transparency – in particular principle 21 – had the most significant impact on financial sector soundness[3]. This is in line with the findings of Beck, *et al.* (2003). In a later study, Demirgüç-Kunt and Detragiache (2010) conclude that compliance with BCPs is in no way robustly associated with bank soundness indicators such as Z-scores.

On the impact of supervisory architecture, Barth, Nolle, Phumiwasana and Yago (2002) found no correlation between the number of supervisory authorities and any of the key features of a banking system. Čihák and Podpiera (2007) found that the unified regime is associated with higher degrees of compliance with BCP, IOSCO and IAIS standards. Arnone and Gambini (2007) showed that a higher degree of compliance with BCPs is achieved by those countries applying a unified supervisory model, with some evidence in favor of those established inside the central bank.

Regarding the impact of the quality of supervisory governance on financial soundness, Das, Quintyn and Chenard (2004) show that the quality of governance matters for banking soundness. Their results also indicate that good public sector governance amplifies the impact of supervisory governance on financial system soundness.

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[3]   Principle 21 states that "Each bank must maintain adequate records that enable the supervisor to obtain a true and fair view of the financial condition of the bank, and must publish on a regular basis financial statements that fairly reflect this condition."

3.3. Supervision and the 2008-09 Crisis

3.3.1. Literature Overview: Supervisory Flaws as a Contributing Factor

The literature on the causes and origins of the financial and economic crisis of 2008-09 focuses mainly on macroeconomic imbalances, macroeconomic policy failures, as well as regulatory failures in all segments of the financial system as major contributing factors[4]. We need to go to a more specialized literature to find a more complete account of the contribution of supervisory failures to the crisis.

Failures attributable to supervisory architectures (the first element in our analysis) as such are only mentioned in two specific cases. For the United States, some fingers have 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) have been mentioned at the time of 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 a architectural failure. Finally there are also the counterfactuals: in the wake of the crisis several countries revamped their supervisory architecture (Belgium, Germany, Ireland) 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 (our second feature) 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. Several authors also point at a general lack of skills to understand the risks related to the new and sophisticated financial products and underlying operations. 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.

In sum, the narrative account of the role of supervision – or lack thereof – in the financial crisis indicates that several of the hoped-for improvements in the incentive structure for supervision have not been effective. The same behaviors, documented during previous crises, such as the 'not on my watch' approach and the

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[4] See among others, Allen and Carletti (2009), Brunnemeier *et al.* (2009), Buiter (2008) and Roubini (2008).

'sweeping of problems under the carpet' have occurred again, sometimes at massive scales.

3.3.2. Our Contribution: Empirical Evidence

A thorough empirical analysis of the role that supervisory architecture and governance played during the crisis has not yet been undertaken. This section reports on our main findings. We employ a new and complex database on supervisory architecture and governance for 102 countries, which will allow us to disentangle the relative effects of different dimensions of supervisory quality on resilience. More detailed results can be found in Masciandaro, Pansini, Quintyn, (2011).

Our interest is in analyzing how differences in supervisory architecture and governance affected country performances during the financial-cum-economic crisis. The global nature of the crisis and the cross country heterogeneity of the impact represent a unique opportunity to shed light on the relationships – if any – between the institutional features of the national systems and their resilience with respect to relevant economic and financial shocks (Giannone *et al.* 2010), We focus our attention on the supervisory features. The study closest to ours is Caprio *et al.* 2011, which, among other indicators, uses an index of supervisory practices to assess its relationship with the probability of a crisis. The index measures the degree to which the country's bank supervisors have the authority to take specific actions, and is not significant. Our analysis differs in several dimensions, given our aim to focus in a deep and systematic way on architecture and governance regimes and the role they played in affecting country performances.

3.3.2.1. *Quantifying Dimensions of Supervisory Quality*

Our first task is to quantify the two measures of supervisory quality that we want to analyze. For the *supervisory architectures*, we introduce two indicators the evaluate the two main characteristics highlighted in the literature: the degree of supervisory consolidation (or unification) and of central bank involvement in supervision. For both indices we apply in this novel field the classical index proposed by Herfindahl and Hirschman (Hirschman, 1964)[5].

The Financial Supervision Herfindahl Hirschman (FSHH) Index measures the level of consolidation of the supervisory powers. It provides a quantitative perspective on the state of the art of the supervisory architectures. Figure 1 presents the situation before and after the recent crisis for groups of countries. Before the crisis (2007, light grey bars) the degree of consolidation was on average greater in the European Union (EU) than in the industrial countries as a whole, or

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[5] See Masciandaro and Quintyn (2011) and Masciandaro, Pansini and Quintyn (2011) for a detailed justification and elaboration of this index.

Europe. The consolidation process in the above three grouping has continued during the crisis (2009, dark bars) while for the entire sample, we notice a slight reduction in the degree of consolidation. In sum, during the crisis the 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 so-called peak model – which dominated the trends in the two decades 1986-2006 (Masciandaro and Quintyn, 2009).

The methodology is also used to construct the index of central bank involvement in supervision: the Central Bank as Financial Supervisor (CBFS) Index. The intuition is quite simple: central bank involvement in supervision is likely to be at its maximum when the central bank is the unified supervisor, while the involvement is likely to be low the smaller the number of sectors where the central bank has supervisory responsibilities. To construct the CBFS index we simply have to take the share of the central bank in each country which can range from 0 to 1.

Figure 1: Financial Supervision Unification
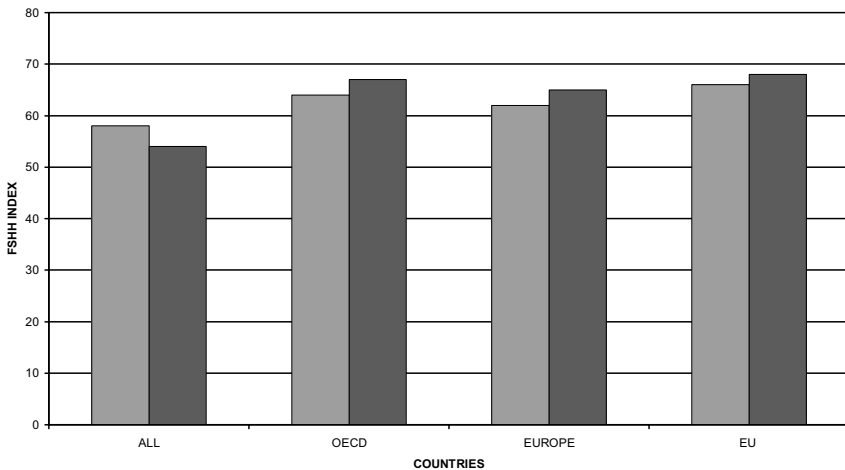
Figure 2 presents the changes in the CBSS Index before and after the crisis. Two facts emerge. Before the crisis (2007, lighter bars) the advanced countries show on average a lower level of central bank involvement in supervision than the entire sample. In turn, among the advanced countries, the European countries and the EU members demonstrate higher degrees of central bank involvement in supervision. However, during the crisis we witness a sort of 'Great Reversal': the 2009 data (dark bars) show that in the advanced, European and EU countries central bank involvement has increased, while it decreased slightly for the entire sample.

This new trend can be explained by two types of considerations. First, in some countries, such as those belonging to the Euro-zone, central banks want to be more involved in supervision because the monetary policy responsibilities are not completely in their hands. Several central banks have become predominantly financial stability agencies (Herrings and Carmassi, 2008). Secondly, and not totally disconnected from the first one, the increasing emphasis on macro supervision following the crisis, forces policymakers to identify specific agencies responsible for macro supervision. In that context, 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.

Figure 2: Central Bank Involvement in Supervision
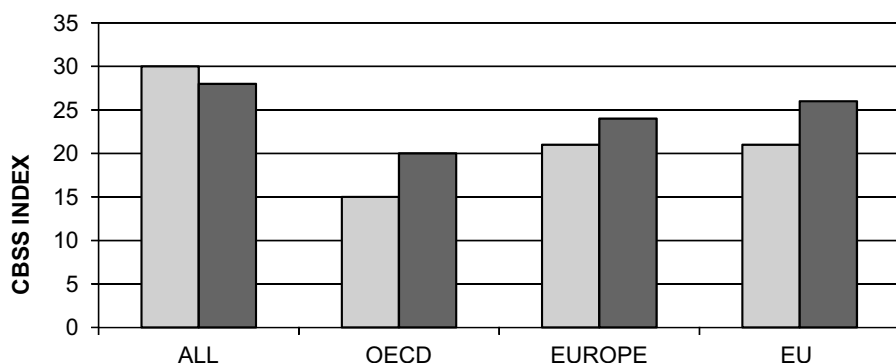
For *supervisory governance*, we build on the earlier work by Quintyn, Ramirez and Taylor (2007) on the computation of independence and accountability ratings for bank supervision agencies. We refer to that paper for the justification of the criteria. Figure 3 presents the ratings for independence and accountability, taken together. Before the crisis (2007, light grey bars) the quality of governance arrangements was rated the highest in the EU, followed by Europe and finally the industrial countries. These three groupings score significantly higher than the overall country sample. In the wake of the crisis (2009, dark bars) all the groupings show further increases in the governance quality.

3.3.2.2.   *Economic Resilience and Supervisory Regimes: Empirical Evidence*[6]

The purpose of our empirical analysis is to determine to what extent and how the above indicators of supervisory quality, as computed before the crisis, are associated with the cross-country variation of macroeconomic and financial perform-

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6   For the detailed empirical analysis, we refer to Masciandaro, Pansini and Quintyn (2011).

ances during the crisis. In principle, higher rated supervisory quality is expected to positively influence the soundness of the financial system. In turn financial soundness can have positive effect on macroeconomic stability: less financial sector disturbances can mean less related losses in the real economy (Cecchetti *et al.* 2009).

We address this question by analyzing the explanatory power of three indicators of supervisory quality – the FSHH Index (unification effect), the CBSF Index (central bank effect), and the total rating of governance (governance effect), all calculated in 2007. Our dependent variable is the average real output growth in the years 2008 – 2009. A graphical inspection of the relationship (figures 4, 5 and 6) already gives a strong indication of the direction of our findings: the degree of supervisory consolidation and the quality of supervisory governance are negatively related to output growth. The degree of central bank involvement shows a weakly positive relationship.

Figure 3: Supervisory Governance Rating
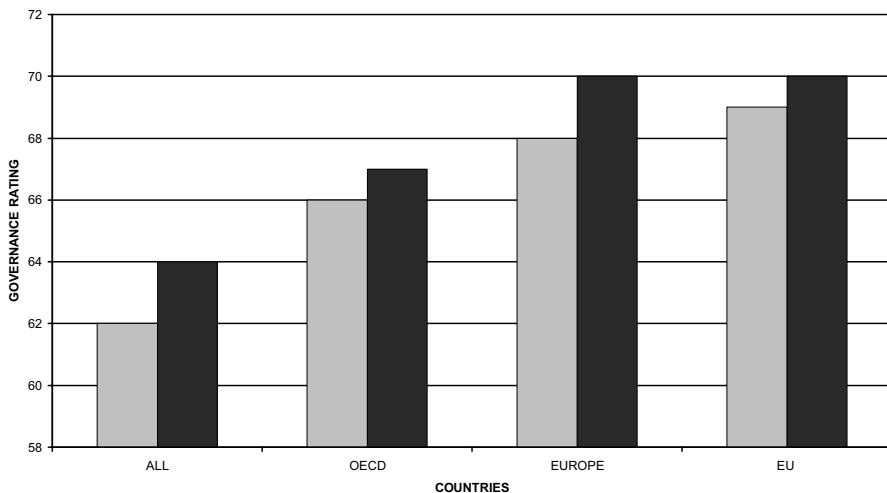
Our regressions (table 1) include three macro key control variables: (i) the log level of income per capita 1996-2006, to control for the relationship between structural richness and crisis (richness effect), which seems to have characterized the crisis; (ii) the average growth rate of GDP in the 2004-06 period, to control for the cross country heterogeneity (heterogeneity effect); and (iii) the log of population in 1996-2006, which captures the structural size effect (size effect). All left-hand side variables in the regressions are dated before 2008, to eliminate endogeneity.

Figure 4: GDP Resilience & FSHH (99 countries)
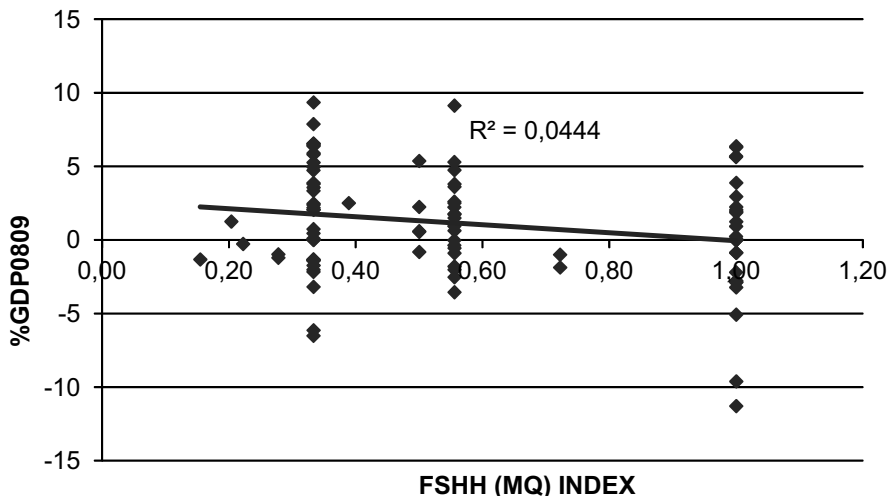
Figure 5: GDP Resilience & CBSS (99 countries)
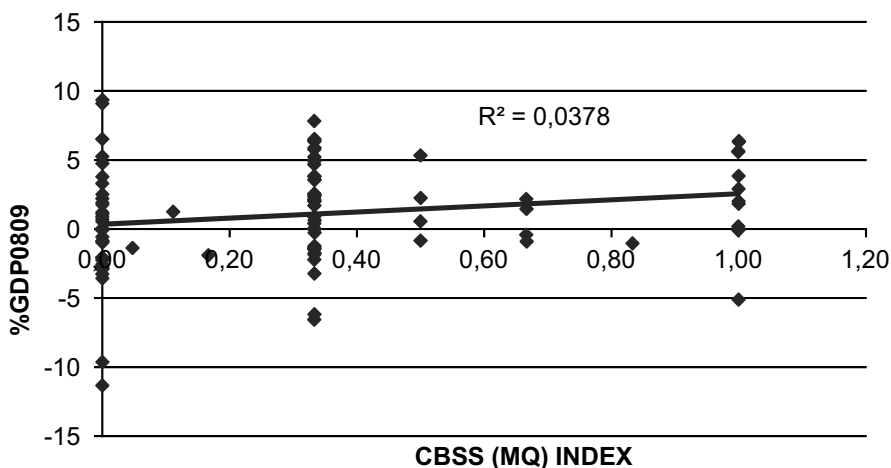
Regressions I and II include the two aspects of supervisory architecture: supervision unification and central bank involvement. The results strongly confirm the impressions obtained from the figures above: more consolidation is correlated with less resilience: the unification effect is negative. Deeper involvement of the central bank in the supervision increases resilience: the central bank effect is positive. These results are confirmed if we consider the two variables together (Regression IV), and the overall regression significance increases slightly. Regression III shows that the quality of the governance is also negatively related to eco-

Figure 6: GDP Resilience & Supervisory Governance (50 countries)
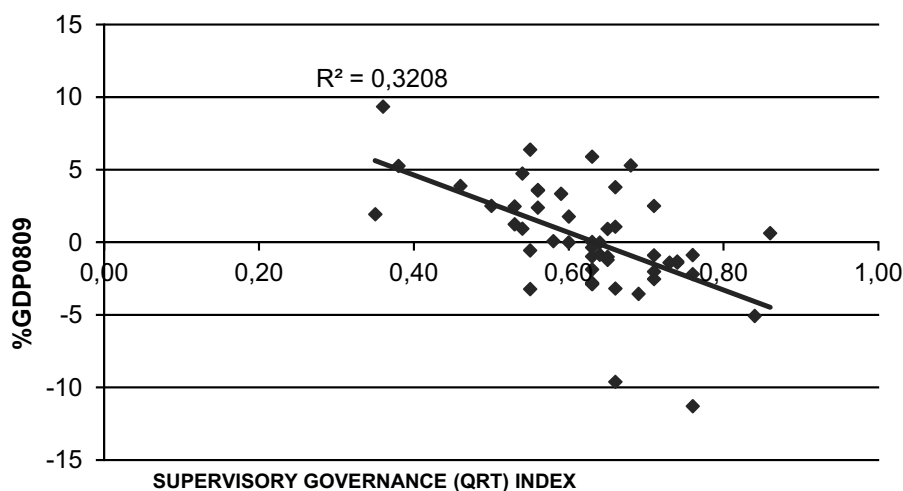
nomic resilience[7]. Considering the three indicators jointly (Regression V) we obtain the same results, with the exception of the central bank effect, which is now not significant. Thus, supervisory unification and good supervisory governance are negatively associated with economic resilience, while the central bank involvement is weakly positive.

To test the robustness of these results, we added in several iterations a number of other potentially relevant variables. These results are not shown here, but we can summarize as follows: adding a variable representing the quality of public sector governance did not change the direction of our results. However this variable in itself is significantly negatively related to output resilience: countries with the highest marks in the quality of public sector governance had the deepest recession. The same is true for the degree of financial liberalization: the highest liberalized countries had the deepest recession, while the impact of our three key variables did not change significantly[8]. Finally, adding a set of variables reflecting the size, depth and performance of the banking and financial industry, also did change the main thrust of our findings.

These results are broadly in line with what others in similar research concluded: Giannone *et al.* (2010) found that the indicators of the quality of public sector regulations – which proxy the 'market friendliness' of the economy – are negatively correlated with economic growth: countries which scored the highest in

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[7]   The set of data on supervisory governance is more limited than on architectures, so the sample in this regression is smaller than in regressions I and II.

[8]   We use the corresponding sub-component of the Worldwide Governance Index – quality of regulation – computed by the World Bank, calculated for 1996-2006. As a proxy for banking regulation/liberalization (banking regulation effect) we use the index computed by the Frazer Institute, calculated for 2004-06.

Table 1: Resilience, Supervisory Architecture and Governance

dependent variable: average real GDP growth 2008-09

	I	II	III	IV	V
FSHHI 2007	-2.296		-2.93		-5.1
	(1.68)*		(2.16)**		(3.00)***
CBSS 2007		2.455	2.936		-0.002
		(2.08)**	(2.49)**		0
GOVRATING07				-16.688	-15.107
				(3.52)***	(3.42)***
GDP grow th 040	0.273	0.23	0.216	0.101	0.074
	-1.75	-1.47	-1.41	-0.51	-0.41
log POP	0.433	1.089	0.654	1.221	0.45
	-0.37	-0.95	-0.57	-0.65	-0.26
log GDP/POP	0.236	-0.021	0.137	0.229	0.4
	-0.24	-0.02	-0.14	-0.15	-0.28
Constant	0.311	-2.08	-0.095	8.546	11.549
	-0.21	-1.8	-0.07	(2.30)**	(3.25)***
Observations	96	96	96	49	49
R-squared	0.09	0.1	0.15	0.36	0.49

Absolute value of t-statistics in parentheses

*,**,*** significant at 10%,5%,1% level

terms of quality of regulation have also been the least resilient to the global recession. The same seems to be true when considering financial resilience, as Caprio *et al.* (2011) do. They find that, other things being equal, more restrictions on bank activities seem to have reduced the likelihood of suffering the recent financial crisis.

Our results convincingly reveal that those features that were meant to strengthen supervision and, through it, financial and economic resilience – supervisory unification and better governance – have not really met those objectives. Both features are across our regressions associated with weaker resilience. Secondly, we also notice that the countries with the best ratings in terms of public sector regulatory framework, as well as those countries with the most far reaching financial deregulation were hit the hardest economically. We also noticed the impact of the

supervisory features under discussion may differ somewhat, depending on the overall (governance) setting. Finally, the degree of involvement of the central bank in supervision did not seem to have had any significant impact on resilience.

3.4.   Financial Supervision: What is next?

The preceding empirical analysis confirms that neither supervisory architecture nor improvements in supervisory governance have been able to prevent or mitigate the crisis, putting into question a large number of assertions that were made before the crisis. Several authoritative voices have proposed modifications – paradigm changes – aimed at remedying some of the ills.

On supervisory architectures we can be short: the foregone conclusion now is that (i) macroprudential supervision should be established as a supervisory activity distinct from microprudential supervision; and (ii) central banks should play a major role in this new field. Work in this area is evolving rapidly. Thus, the pre-crisis paradigm, supporting a trend towards supervision unification and central bank specialization is being replaced by a twin-peak model in supervision (macro-micro), with central bank involvement, at least in macro supervision.

On supervisory approaches and practices, the crucial question that we are facing once again is, how can incentive structures for supervisors be better aligned in order to avoid a repeat of what happened in the run-up to the latest crisis? Nearly all recommendations go in the same direction[9]. A consensus is emerging that in this post-crisis environment, supervision needs to be *more intrusive (the new buzz word), proactive, risk-based, and result-oriented*. This new supervisory approach should be achieved by improving the incentive structure for supervisors so that the capture traps are avoided. Most analysts converge on measures such as *clarifying the mandate for supervisors, having more independence and accountability, and bringing in more and higher skilled professionals that enjoy higher monetary compensation*, to achieve this objective. Higher skilled professionals with higher compensations are also needed to avoid that the profession stays behind the curve when it comes to new developments in the financial system.

While we concur in principle with this analysis and the proposed way forward, we would like to point out some of its limitations and potential pitfalls. It is beyond doubt that financial supervision needs indeed to have the qualities listed above. Palmer and Cerutti (2009) show that those countries (such as Australia, Canada and Spain for instance), where supervisors had these qualities, fared on

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[9]   For the most authoritative reports, see M. BRUNNEMEIER *et al.*, 2009, CLAESSENS *et al.*, 2010, DE LA TORRE and IZE, 2009, ENRIQUES and HERTIG, 2010, FSA, *The Turner Review* 2009, PALMER and CERUTTI, 2009, TABELLINI; 2008, VINALS *et al.*, 2010, WEDER DI MAURO, 2009, and WELLINCK, 2011.

average better in the crisis (other factors also contributed to their relative success).

These new accents in the supervisory approach can indeed be fostered by more solid governance arrangements. It is beyond doubt that supervisory governance needs further improvements to provide the right incentives to cope with three types of capture: political, industry and self-capture (Masciandaro, Quintyn and Taylor, 2010 and Dijkstra, 2010). As discussed elsewhere, levels of supervisory independence and accountability vary widely across the world (see rankings in figure 3). Independence is on average much lower than for central banks as monetary policy agents. Accountability arrangements – the indispensable complement to independence – are often poorly developed. Hence, improvements are desirable, and, as Figure 3 shows, several countries have already taken action.

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 stem from the fact that, 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. Thus, it will be extremely difficult to precisely specify the agent's objectives (Goodhart, 2001, Schuler, 2003 and Quintyn and Taylor, 2007). 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 can be eliminated. So, the first best solution, *i.e.* define the right governance arrangements to address the supervisors' incentive problems has its own limitations.

Moreover, recent experiences during the crisis have 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. So, *de facto* independence seems at least as important as *de iure* independence. The crisis record (corroborated by the empirical findings in this paper) shows indeed that, on the one hand, several countries with strong (de iure) independence and accountability arrangements were most severely hit by the crisis, while others with relatively weaker arrangements on paper emerged relatively unscathed from the crisis. Take the example of Canada: the supervisory agency does not score very high on *de iure* independence. However, practice shows that its *de facto* independence is high, which, combined with a strong supervisory tradition (Palmer and Cerutti, 2009) has contributed to escaping from the crisis. Conversely, countries with higher governance ratings, either did not fully use them, or missed the proper supervisory culture as described above, and failed. So the bottom line is that improvements in supervisory governance per se, are not a panacea for all supervisory failures, as proven

by our empirical analysis. Improvements in supervisory governance take time to change supervisory approaches and cultures.

Combining these two major points – 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 supervisory approach and culture – forces us to think about second-best solutions to align supervisory incentives.

The new financial architecture that is emerging in the wake of the crisis – separation of macro and micro prudential supervision – offers a great opportunity to conceive such a second-best solution that potentially can offset some of the inherent weaknesses in our first-best approach: let us combine the new architecture with good governance practices to better align supervisory incentives.

Here is the reasoning: in response to the crisis, the new trend in several countries is to establish a separate function for macroprudential supervision. Although the institutional forms vary and are evolving, a common trend seems to be to assign this task to the central bank, or for the central bank to play a pivotal role. Based on a survey of 63 countries IMF (2011) reports that in 19 out of 22 countries that have a formal mandate for macroprudential supervision the central bank is the sole institution in charge, or plays a key role, together with one or more other institutions[10]. So, the more fundamental movement seems now to go in the direction of a two peak model with one peak for macroprudential supervision, the other for microprudential supervision. However, these peaks are in the first place functional peaks. While there is a growing consensus on these functional peaks, the architecture is still largely under discussion. Some countries are assigning the tasks to two separate agencies, while others prefer to have micro- and macroprudential supervision under one roof.

The presence of two institutions involved in the same field of operation (but with a different mandate) would allow for check and balances to operate among both institutions. These checks and balance could reduce the likelihood of capture (of any type). The proposal to rely on checks and balances between two institutions involved in supervision is based on a model developed by Laffont and Martimort (1999) and a recent extension of their work by Boyer and Ponce (2010).

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, *i.e.*, for splitting authorities among dif-

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[10] These institutions include financial stability council, ministry of finance, bank supervisor, integrated supervisor, supervisor of other subsector or deposit insurance agency.

ferent supervisory agencies. 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. They show that in this case there is scope for separation. Separation of supervisors divides the information at their disposal 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. When this Bayesian-Nash behavior is such that the regulators offer safe bribes that can always be provided by the interest group, the outcome of this collusion game 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 (2010) adapt this framework to analyze the implications of capture on the optimal allocation of micro and macroprudential supervision. They conclude from their model 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. While the two models start from industry capture as the main threat, Boyer and Ponce (2010) show that their results hold for any type of capture. In reality, the demarcation line between the three types of capture mentioned earlier is often hard to draw and capture is very often of a mixed nature.

A likely architecture would be to house macroprudential supervision in the central bank (for the reasons given in the literature) and microprudential 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 agency; (iii) synergies are created because the analytical scope of macroprudential supervision is closer to the core focus of the central bank; (iv) there is a clear link between macro-prudential supervision and the central bank's function of liquidity provisioning.

The proposed division of labor would also entail some costs: (i) in order to maintain the checks and balances, there would be a need for some double reporting by the financial sector; (ii) there is a need for general coordination between both agencies while maintaining the checks and balances; (iii) coordination is also

needed when it comes to deciding who will take specific measures (against individual banks or groups of banks) and even more so when authority needs to be transferred to a resolution agency (see also Palmer and Cerutti, 2009, p. 43). 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 our proposal is founded indicate that these costs are lower than the potential benefits.

3.5.   Conclusion

The end of the Asian systemic financial crisis marked the beginning of intense efforts on several fronts to improve the quality and impact of financial sector supervision. The BCPs were promulgated as best practices to frame and guide the supervisory process; attention went to arrangements to improve supervisory governance, both internally (integrity) and externally (independence, accountability, transparency); and supervisory architectures were revisited to enhance efficiency and effectiveness of supervisory processes. Finally, more reliance on market discipline was also promoted as a check on the supervisory process.

During the 'high tide' in the first years of the new millennium, empirical evidence on the positive impact of these new initiatives on bank soundness was not conclusive, but hope remained that a possible new crisis could be mitigated by these new arrangements and processes.

However, the financial and economic crisis that started in 2007-08 meant the great awakening from a dream: countries that were believed to be among those with the most solid supervisory systems were hardest hit by the crisis. Several accounts by academia and policymakers now point at major failures in the supervisory systems in the run-up to the crisis. Our empirical analysis, undertaken with a new database on indicators of the quality of supervision, leaves little doubt: consolidation in supervision and good supervisory governance are negatively correlated with resilience; the degree of involvement of the central bank in supervision did not have any significant impact on resilience.

So, given this major defeat, the question is what to do next. Recommendations by several authors converge on promoting more intrusive and proactive supervision implemented by staff with higher skills. All scholars and policymakers agree that this new approach needs to be backed by better governance arrangements. We pointed out that improvements in supervisory governance, while certainly needed, have their limitations. Better governance will never be able to completely align the supervisory incentive structure because the supervisory contract will, by its nature, always be incomplete. We therefore suggest (based on the Laffont and

Martimort (1999) model) to exploit the opportunities offered by the newly emerging supervisory architecture, with one pillar in charge of macroprudential supervision and one in charge of microprudential supervision: if both pillars are institutionally separated, a system of checks and balances between both is created, which would reduce the opportunities for political, industry and self-capture. It seems that the benefits of such an arrangement would be greater than the costs it involves. Several countries are still in the (re)design phase of their supervisory architecture and this second-best mechanism can be used in conjunction with improvements in supervisory governance to better align supervisory incentives.

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4. SYSTEMIC CHANGES IN THE FINANCIAL WORLD AND THE SEARCH FOR THE NEW PARADIGM OF FINANCE

Adam Szyszka

Abstract

The paper discusses a hypothesis that the neoclassical theory of finance lost its credibility due to systemic changes that have happened within institutions, markets, and instruments over the last three decades. It is suggested that the theory should be modified in line with dynamically changing financial environment. The neoclassical financial economics is challenged with the behavioral approach to capital markets. Practical implications of the behavioral view for market participants: investors, corporate managers, and regulators are discussed. Behavioral aspects of the recent financial crisis are also presented. Finally, conclusion is reached that an interdisciplinary approach is needed in the search for an adequate theory of finance. The neoclassical paradigm might be seen as an idealized normative benchmark. On the other hand, behavioral finance help explain deviations from this benchmark, however itself it lacks the normative character. Behavioral approach is a valuable supplement when trying to understand financial markets, but so far should not be treated as a rigorous and completed alternative theory.

Keywords: paradigm of finance, transformation of financial markets, neoclassical economics, behavioral finance, psychology of capital market, financial crisis.

JEL Classification: G1, G2

4.1. Introduction

The recent financial crisis gave rise to questions regarding fundamental issues of the current paradigm of finance. Dramatic events opened our eyes and let us see that behavior of financial markets is far from what we had imagined them to function like.

In this paper first we look at systemic changes that financial institutions, markets, and instruments have undergone. We wonder if the these transformations and their effects give grounds to modify theoretical background of finance and to search for a new paradigm that could better describe processes occurring in the global financial market.

We confront the traditional neoclassical financial economics with behavioral finance focusing on key assumptions, predictions, and findings of each of these schools of thought. We state that the neoclassical paradigm might be seen as an idealized normative benchmark which predictions – although derived from neat mathematical models and formulas – are often very far from reality. On the other

hand, behavioral finance is more intuitive and descriptive. Behavioral approach helps explain deviations from the neoclassical benchmark, however itself it lacks the normative character. Behavioral approach might be a valuable supplement when trying to understand financial markets, but so far should not be treated as a rigorous and completed alternative theory.

Later we discuss consequences for investors, corporate managers, and regulators of capital markets. We show how adopting the behavioral view impacts these three groups of market participants and how it should influence their actions.

In the last section we present behavioral issues that demonstrated themselves particularly during the recent financial crisis. Although direct reasons for the crisis had macroeconomic grounds, behavioral aspects greatly contributed to the scale and scope of the trouble. In this context we discuss psychological background of greed, underestimation of risk, herding, limited rationality and mistakes of rating agencies, as well as fear as a reason for excessive selling and resulting undervaluation.

In final remarks we postulate an interdisciplinary approach in building a new adequate theory of financial markets.

4.2. Systemic Changes in the Financial World

Over last two decades we have witnessed processes of economic globalization, increasing international and inter-industrial ties, growing global macroeconomic imbalances, and strengthening competition both on local and global markets. Financial sector has been a subject of particularly significant changes. Transformation, or rather revolution as one should say, took place in three main areas: within financial institutions, in the way of organization and functioning of financial markets, and among financial instruments.

4.2.1. Institutions

During last 20 years investment banks have greatly gained in importance. Holding capital amounts in many cases greater than state budgets of many countries, investment banks became global players with wider and wider profile of activities, beyond traditional understanding of investment banking (greater spectrum of investing on own books, including pure speculation, tendency to engage in areas reserved previously for insurance companies, growing connection to retail banking and consumer finance). The segment of investment funds has changed, too. Speculative funds and hedge funds have been developing dynamically and gained a vast share in the asset management market. A completely new category of institutions – sovereign wealth funds – has also occurred. They supply lots of

capital and often provide liquidity when it is needed, but on the other hand their appearance has risen a question about geopolitical and strategic criteria in asset allocation. These state controlled investors may have other than purely financial criteria of investment. Finally, not without an impact to the institutional sphere was the liberalization of the US law. The Depository Institutions Deregulatory and Monetary Control Act of 1980 among others gave birth to development of non-banking financial organizations targeted at high risk lending, including mortgages offered to people with low creditworthiness (so called NINJA).

4.2.2.   Markets

Financial market trading platforms have also been subject of vital transformation. We have witnessed a process of consolidation of exchanges and a tendency to cross-list the same financial instruments on different markets over the globe. Development of telecommunication means, and Internet in particular, made dealing with financial instruments really global and active practically 24 hours a day. Exchanges started to implement electronic trading systems, gradually diminishing the role of the traditional human factor (market makers). Automatic order systems have gained in importance, particularly among big institutional players. Volatility has greatly increased in almost all categories of assets. Volume and value of transactions have significantly grown in all markets, but predominantly in commodities and derivatives. These two markets have been subject to most significant changes of systemic character.

4.2.3.   Instruments

Commodities became commonly treated as any other financial assets, and traded to a great extend for speculative purposes. Since the beginning of 2002 we have witnessed dynamic price growth in commodity markets, which continued and reached its peak only in mid-2008. Initially it could seem that the boom was justified in the context of an intensified demand for raw materials coming from fast-developing economies. However, the growth dynamics of commodity prices was much higher than the accompanying increase in global demand. Investors started treating *e.g.* crude oil or copper as ordinary financial assets in which they could invest the surplus of cheap money, hoping for further growth in demand and hence – also growth in prices.

Even greater and more dynamic changes happened in markets for derivatives. Over two recent decades derivatives have been more and more frequently used for speculative purposes rather than risk hedging, which was their primary purpose. According to the data of the Futures Industry Association (FIA), in 2007 the total trade volume of derivatives in 54 stock exchanges worldwide amounted to 15.2 billion pieces (of futures contracts and options), whereas in 1999 that vol-

ume only amounted to 2.4 billion pieces. The Bank for International Settlement (BIS) estimated that in 2007 the value of the stock exchange trading of derivatives amounted to almost USD 2.3 trillion, and at the end of the year the take up value on exchange derivatives amounted to over USD 28 billion. This value should also be increased by the value of derivatives transactions entered into on the OTC market. Statistics concerning the total volume of transactions in the global OTC market are not available but its size is reflected by the actual value of outstanding contracts which the data of BIS valued at USD 595.3 billion at the end of 2007. A vast majority of derivatives transactions concerned financial underlying assets. The share of derivatives transactions associated with non-financial assets (*e.g.* agricultural produce, energy, precious metals, raw materials) did not exceed 10%[1].

One might risk a conclusion that the dynamic development of the derivatives markets led to abandoning the typical function of money in economy, *i.e.* its traditional currency function. In the beginning, money followed merchandise. When specific goods were purchased, money was used to pay for them. Now, money and goods circulations became largely separated. Money and monetary products became merchandise themselves, with an increasing number of derivative transactions based on them. The volume of trade in the derivatives markets became even 10 times higher the volume in the markets of their underlying assets. There were two primary reasons for this effect. First, the development of the derivatives market was driven by greed and a chase after profits accompanied by a simultaneous growing tolerance for risk. Various derivatives with built-in leverage mechanism were needed, which, though highly risky, were able to deliver high returns. Second, a high supply of cheap money in the economy facilitated asset monetization, and new derivative products made it possible to trade new asset categories in the financial markets. The most spectacular and, as it later turned out, the most fateful type of asset monetization was the creation of derivatives the value of which was associated with a mortgage portfolio.

4.3.   In the Search for the New Paradigm of Finance

Consequences of above mentioned changes in financial institutions, markets, and instruments demonstrated themselves particularly in the time of the global financial crisis in 2008. In the lieu of those turbulences of extraordinary scale, dynamics, and range, a question has been asked if the traditional paradigm of economics – and within it, the neoclassical theory of finance – adequately describe the economic reality and events occurring in the financial world. Any theory is only as good as its ability to explain or predict the processes actually taking place.

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[1]   FIA Annual Volume Survey 2007, *BIS Quarterly Review* 2009.

4.3.1.   The Traditional View

The key element of the neoclassical theory of finance is the Efficient Market Hypothesis (EMH) that states that financial markets always efficiently incorporate all available information into asset prices (Fama 1970). The argumentation in favor of the EMH seems quite appealing. In short, it follows like that: When all people are rational markets are efficient by definition. When some people are irrational, their behavior is usually uncorrelated and the impact of their trades is too weak to influence prices. Finally, when sometimes irrational investors behave in a correlated manner (like a herd) and they sometimes have enough of a market force to drive the prices away from fundamentals, then active and unlimited trades of rational arbitrageurs will countervail and bring the prices back to right levels.

The EMH is closely related to two other cornerstones of neoclassical financial economics: the Capital Asset Pricing Model (CAPM) developed independently by Sharpe (1964), Lintner (1965) and Mossin (1966), and the portfolio theory of Markowitz (1952). If market is efficient and all available information is correctly reflected in asset prices than investors should not expect to achieve in a long term higher returns than the level justified by the amount of systematic risk. In such a case each investor should hold a well-diversified efficient portfolio – this means a collection of assets that altogether either have a minimum covariance with the market portfolio (minimum systematic risk) for a given level of expected return or offer maximal expected return for a given level of systematic risk.

The traditional school of financial economics has one main advantage – It is of a normative character. The key elements of the theory are coherent and allow deriving predictive models that might be tested. It also has one main disadvantage – It has been based on many unrealistic assumptions. The building blocks of the traditional finance rely mainly on investors' rationality (the concept of *homo economicus*) and on strength of the self-correcting mechanism of arbitrage (the notion of *perfect market*). However, these features are not always confirmed in realistic market circumstances.

4.3.2.   The Behavioral Approach

Behavioral finance is an area within the finance discipline that focuses on investors' behavior and the decision making process in order to understand anomalous pricing of assets and other puzzling observations taken empirically from capital markets. It has emerged in the response to the difficulties faced by the traditional theory in explaining some financial phenomena. In the contrary to the classical paradigm, behavioral finance assumes that agents may be irrational in their reactions to new information and investment decisions. The sources of irrationality are psychological biases and heuristics of a human mind. It can be difficult for

rational traders to undo the mispricing caused by irrational investors due to existing limits of arbitrage. As a result, markets will not always be efficient and asset pricing may deviate from predictions of traditional market models[2].

4.3.2.1. *Investor's Psychology*

Psychological sources of irrationality may be categorized in a following way. First, people make mistakes when they perceive information and form their beliefs. Extensive evidence shows that individuals are overconfident in their judgments (Odean 1998, Barber & Odean 2001). They are typically also overoptimistic and see things better than they really are. Sometimes their optimism comes from wishful thinking. Generally overconfidence and over-optimism make investors trade too much and too intensively. In the result they take too much undiversified risk and lose money on heavy transaction costs. This also may cause market to overreact to new information. Further, people have problem with representativeness, sample size and understanding the law of return to the mean (Shefrin 2000). This leads to difficulties in drawing correct conclusions based on available information. Among other things, it increases the belief in trend continuation or reversal of direction in which prices change. Once people have formed an opinion, they often stick to it and inadequately update their beliefs in the lieu of new information (Edwards 1968). The initial value may sometimes be even suggested subconsciously and still strongly influence the agent's opinion (so called *anchor* – Kahneman & Tversky 1974). Conservatism, belief perseverance and anchoring slow down the reaction of the market to new information.

Second important source of irrationality comes from unstable preferences that may vary depending on a context in which the alternatives are presented. Logically the same decision problems may be solved differently by the same people when the situation is described in another way. This contradicts the axioms of the standard utility theory. Kahneman and Tversky (1979) propose the prospect theory in which utility is defined over changes of wealth comparing to a given reference point rather than over final wealth positions. The main finding of the prospect theory is that people are risk-averse over gains and risk-seeking over losses. This means that they usually prefer a certain gain than a gamble of the same expected value with a chance for much higher win. On the other hand, when faced with a choice between a certain loss and a gamble of the same negative expected value (that potentially may lead to even a greater loss, but also gives a chance to avoid the loss), people usually prefer to take the risk and to gamble. Kahneman and Tversky argue that the sensitivity to losses is greater than the sensitivity to gains. In other words, a loss of 1000 US$ is more painful than the

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[2]   Thaler (1993, 2005) edited two collections of most significant papers in the area of behavioral finance. Books by Shefrin (2000, 2005), Shleifer (2000), Szyszka (2007, 2009), and Baker & Nofsinger (2010) are also good sources for readers interested to find out more about the behavioral approach to finance.

satisfaction from a gain of 1000 US$. The prospect theory explains so called disposition effect – eagerness of people to sell an asset that has just brought profit and strong reluctance to close a position that has been bringing losses. The disposition effect may be responsible for market underreaction to new information, particularly for slower reflection of bed news in prices.

Szyszka (2010a) proposes the Generalized Behavioral Model which describes how aggregate errors in the processing of information signals, aggregate representativeness errors, and the biases in investor preferences may influence prices and returns from assets.

Further cause of irrationality often lays in human emotions and moods. Generally people who are in good moods are more optimistic in their choices and judgments than those in bad moods. Investors in good moods are ready to accept higher risk. Bad moods are associated with more scrutiny and criticism when evaluating new information (Petty, Gleicher & Baker 1991). Shefrin (2000) points at two kinds emotions – greed and fear – that have contradictive influence on investors' risk approach and strongly influence the way they construct their investment portfolio. Greed pushes people to treat stocks as lottery tickets – they want to win as much as possible and as quickly as possible. In the result, they do not diversify and take risky positions in two-three assets hoping to earn high returns if their picks are right. On the other hand, fear is like brakes in a speeding car. It gives limits to greed. People usually care about the future and are afraid of unexpected negative events that could dramatically lower the level of their consumption. They tend to hold some proportion of their wealth in very safe assets (cash deposits or T-bonds) that serve like a security policy ('just-in-case…'). In other word, a combination of greed and fear leads to wrong diversification of investment portfolios. Investors do not use the Markowitz's theory and overlook the covariance between assets. They isolate mentally the few risky assets and the 'just-in-case' safe investment they hold.

Finally, social influence and interaction with other people also may cause irrational behavior. Investors may make common mistakes in a correlated manner as the result of their learning process in a society, direct interpersonal communication, influence of social groups in which they live, and – most of all – because of the force of media news. People often behave like sheep – they follow each other like in a herd. But what is interesting – herding does not always have to be irrational. Rational traders may also decide to follow the group if they rationally calculate that making money 'on the wave' is more likely than fighting against the flow of irrational players. Herding leads to a situation when investors concentrate more on predicting what other market participant think than on real information related to a particular security. When investors are pronoun to various fashions and fads, market quotes may deviate far from fundamental values.

4.3.2.2. *Limits to Arbitrage*

Behavioral finance does not negate the arbitrage mechanism *per se* and its price-correcting ability. However, it argues that not every deviation from fundamental value created by actions of irrational traders will be an attractive investment opportunity for rational arbitrageurs. Even when an asset is widely mispriced, arbitrage strategies designed to correct the mispricing can be risky and costly, rendering them unattractive, and sometimes can be even impossible to conduct at all. As a result, the deviation from fundamental value may remain unchallenged for a relatively long time.

When arbitrageurs discover an asset that is wrongly priced on a market, they need to find the same asset priced correctly on another market or a perfect substitute of this asset, in order to take opposite arbitrage positions. When they are not able to do so, they face the fundamental risk – the risk that some new information comes to the market and changes the fundamental value of the asset in the undesired direction.

Even when arbitrageurs are able to hedge the fundamental risk completely and take a long position in the asset where it is cheaper and a short position in the same asset on the other market where it is more expensive, they still face so called noise traders risk. This is the risk that irrationality on the market may become stronger and may drive the mispricing to even a greater extent (DeLong Shleifer, Summers & Waldmann 1991, Shleifer & Vishny 1997, Shleifer 2000). As the mispricing increases, the gap between long and short positions gets wider and against the strategy of rational arbitrageurs. If such a tendency continuous over time, arbitrageurs – whose investment horizon is usually relatively short and who often borrow money and securities to put on their trades – may be forced to close their positions before the mispricing is corrected. If this is a case, they will suffer losses.

But a single arbitrageur who spots the mispricing faces not only the noise traders risk, but also the risk of synchronization of actions of other rational traders (Abreu & Brunnermeier 2002). Typically a single arbitrageur does not have enough of market force to correct the mispricing individually. He needs other arbitrageurs who will follow his strategy. However, he does not know if and how quickly other rational traders notice the same arbitrage opportunity and take adequate positions. Waiting might be costly and each arbitrageur has a finite time and cost limits.

4.4. Practical Implications

Behavioral finance changes the way we should look at capital markets. This new approach has significant consequences not only directly to investors, but also to corporate finance, market regulators and policy makers.

4.4.1. Implications to Investors

The EMH rules out the possibility of repeatable investment strategies based on currently available information that have expected returns in excess of the market expected return for a particular level of systematic risk. In other words, an average investor – whenever an individual or professional – should not hope to consistently beat the market. In a short term achieving abnormal returns is possible, but only as a simple result of luck, and not due to whatever trading strategy used or resources spent on analysis. In the light of the EMH the best investment strategy is the passive 'buy & hold' approach – investors should hold well-diversified portfolios, allowing only for the systematic risk in the amount adjusted to a subjective degree of risk aversion and expectation of returns. Often changes to the portfolio are not recommended, as active trading only generates transaction costs and cannot help at all to achieve long-term abnormal returns.

Behavioral finance challenges this view, what is a natural consequence of confronting the EMH. According to the behavioral approach market is not always efficient and investors who make a better than average use of available information are able to make abnormal returns. In this light, it might be worth to seek good investment opportunities and to spend resources on investigation of the mispricing that occur from time to time on the market. Active trading strategies might be indeed better in some cases than passive 'buy & hold'. This is a rationale for various hedge funds, so called opportunity funds, and other active portfolio management. However, active investors should bear in mind that they also may be a subject of behavioral biases and heuristics. Therefore, achieving higher returns is possible not only thanks to better analysis and strategies, but also requires a better self-control.

Behavioral finance does not rule out completely the utility of traditional analytical tools and pricing methods derived from traditional finance. However, these models should not be treated dogmatically as the only precise way to judge investment choices. In the end, they are only a simplification of complex processes ongoing in reality on capital markets. Traditional finance should be seen more like a theoretical benchmark that needs to be enriched by various aspects of investors' psychology and human actions. Behavioral market models concentrate on predicting deviations from traditional models. They focus on investors' irrationality and attempt to identify factors responsible for its direction and strength.

When mispricing is noticed investors should ask themselves about the reasons for the situation and should try to predict its future development. If behavioral analysis indicate a high probability of further increase of irrationality that potentially may lead to even a bigger mispricing and at the same time there are limits to arbitrage, than also for a rational investor it might be worth to 'hop on a train' and to buy assets that according to traditional valuation methods might seem overpriced. In the lieu of traditional finance such a decision would be irrational, but in the framework of the behavioral approach it is acceptable. It might bring abnormal profits as long as the investor is able to sell these assets for a higher price before irrationality gets weaker and finally stocks are brought back to fundamental levels. Obviously such practices of rational speculators do not serve well market efficiency and stabilization.

4.4.2. Consequences to Corporate Finance

If markets are efficient, then the cost of equity is always priced correctly. Current market situation should not influence corporate capital structure. Companies should not be extra motivated to make additional equity offerings in a bull market – when they are potentially overpriced, nor to buy-back their stocks in a bear market – when they seem to be undervalued.

Behavioral finance offers a different view. High market valuations are motivation for increasing equity. Relatively cheap equity often lowers total weighted average cost of capital (WACC) for the company. This may boost investment, as more projects have positive net present value (NPV). In bad times the company will tend not to make new equity offerings. New investment projects will be financed with a higher leverage or put on hold. More debt will be allowed in the capital structure. Low market valuation may also stimulate the company to buy-back its stocks.

Behavioral approach may help to choose an optimal moment for a new offering or a buy-back transaction. It is also helpful when planning a takeover of another firm in a public tender offer. Knowledge of investors' preferences is necessary when structuring the transaction and to set the price right. For example, even if a price in a tender offer is higher than a current market price (takeover premium), but the tender offer takes place after a series of negative returns, the reply to the offer may not be sufficient. This may happen, because investors are stopped by a strong aversion to losses, if the tender price is set below their reference point that usually is their buying price.

Psychological aspects are also important when communicating with the market. The way the news is put into words or numbers may influence the strength of market reaction to it. People usually overreact to good information and underre-

act to bad news. They pay more attention to a descriptive report than to statistical or numeric data. They are sensitive to the context in which the information is given. For example, assume that the current firm's performance is better than last year, but worse than earlier forecast and market expectation. News like "The current profit is higher than the last year's profit by…" will be definitely better received than the same information formulated "The current profit is lower than expected by…".

Finally, we should not forget that corporate managers may also be a subject to behavioral biases. Wrong judgment of probability accompanied by overconfidence may lead to underestimating risk of an investment project. Particularly strong and dangerous inclination is associated with so called sunk costs. Decision makers are usually unwilling to give up a project that has already consumed a lot of money and effort. Even if it becomes more and more obvious that the project has little chance to be profitable, managers are often ready to spend more and more money on it. They do not want to admit their mistake and attempt to delay the moment they have to report a loss on the investment. This is similar to the disposition effect observed among stock market investors. The sunk cost effect and the disposition effect have both their roots in the strong human aversion to accept final losses.

4.4.3.   Consequences to Market Regulators and Policy Makers

Rejection of the efficient market paradigm results in a serious challenges for those who are responsible for the market infrastructure and regulations. It clearly turns out that the self-regulating market mechanism is imperfect and requires proper regulations that take into account a possibility of irrational human behavior. The aim of regulators and policy makers should focus on creation of such conditions in which behavioral inclinations have minimum impact on asset pricing and the market behaves as close as possible to the idealistic predictions of the neoclassical theory.

First, a wide-scale educational action is needed. Individual investors should be taught about psychological traps, in particular they should be warned about all sorts of manias, fads and other cases of herding. The more investors are aware about possible sources of price deviation, and the more they search for cases of mispricing to use them for their own profits, the higher the market efficiency.

Second, the sector of institutional investors should be shaped in the way that accounts for possible behavioral biases of professional asset managers. Among other things, there should be incentives for professionals to think more in a long-term perspective, and not only to pay attention to relatively short reporting periods. Window dressing practices should be discouraged by closer evaluation and

audit. Compensation structures should be designed with consideration and should offer deliberately higher bonuses for being above the average than penalties for results below the benchmark. Benchmarks should be set appropriately.

Finally, regulators and policy makers should work hard on minimizing limits to arbitrage, at least in cases where it is reasonable. Support of stocks' liquidity, unproblematic possibility to short all assets, low borrowing fees and other transaction costs, easy access to information are among most straightforward postulates. Fewer limits to arbitrage both for individuals and professionals enhance the self-regulating market mechanism and reduce the impact of behavioral biases on asset pricing.

4.5.   Behavioral Aspects of the Recent Financial Crisis

4.5.1.   Greed of Investors and Managers

According to the behavioral portfolio theory (Shefrin & Statman 2000) people are guided by two kinds of emotions when investing: fear and greed. Because of the fear of drop in consumption below their existing standard of living they are inclined to keep a portion of their savings in very safe securities designed mostly to preserve the real value of money in time (*e.g.* treasury bonds). Greed, in turn, arouses hope for a rapid growth in consumption and a fast jump to a higher standard of living. Because of greed investors fail to properly diversify their investment and accept high often unnecessary risk in hope of gaining high profits, oftentimes betting on investment in selected financial instruments as on lottery numbers.

During a long-lasting prosperity the fear of a drop in consumption weakens and hence an increasingly small portion of people's investment is mentally accounted as security for incidental needs. Greed comes forward and it motivates people to make increasingly risky investment. It seems that greed has been the main driving factor of investors' behaviors at least several years before the financial crisis occurred. Encouraged by the long-lasting market boom, investors required higher and higher rates of return, oblivious to the risk. At the same time, they exerted pressure on both corporate managers and on investment fund managers demanding high profits from them. In turn, both corporate and asset managers adopted more and more risky business and financial strategies to meet expectations of the investors.

The main instrument that made it possible to ensure returns on equity (ROE) at the level significantly higher than that resulting from the natural pace of economic development was to apply the financial leverage to a greater and greater extent. In the case of corporations this was most frequently reflected in an

increased share of debt in financing of operations, whereas financial assets managers increasingly often used derivatives along with traditional credit lines.

The high share of debt in the corporate financing makes it possible to ensure return on equity (ROE) significantly exceeding the total return on assets (ROA). Financial risk related to the debt actually increases, but in the times of cheap and commonly available capital investors seemed not to notice that risk. As the result, high profitability of equity was one of the factors that drove and seemingly fundamentally justified the high market price of shares.

A similar mechanism was applied by asset managers. Using increasingly complex derivatives, they were getting involved in financial transactions with values exceeding multiple times the equity held in management. Because of the financial leverage, the rise in the price of underlying assets by several percentage points often made it possible to obtain the return on investment in derivatives of several dozen percent. Unfortunately, it was obviously forgotten that this mechanism works both ways and if the value of underlying assets falls, losses on investment in derivatives can also be many times higher.

Greed that pushed investors and managers towards riskier and riskier investment strategies did not as such directly contribute to the financial crisis whose sources should be sought in the global macroeconomic imbalance, but it rather determined its scale, arising from material leveraging of business operations and involvement in derivatives.

4.5.2.   Underestimation of Risk

It can be said that greed blinded investors and managers. Risk was often forgotten in the midst of the chase after higher and higher rate of return. Several strong behavioral inclinations, mostly related to overconfidence were also conducive to underestimating risk (Szyszka, 2010b). The literature distinguishes between four general manifestations of overconfidence: above-average effect, calibration effect, illusion of control and unrealistic optimism (Odean 1998, Barber and Odean 2001, Glaser and Weber 2003).

Overconfidence is supported by the self-attribution bias which consists in attributing successes (even random ones) to ourselves and our capabilities and explaining failures by independent factors, *e.g.* bad luck, mistakes of others etc. (Taylor and Brown 1988). Lack of objectivity in assessment of successes and failures limits our ability to learn from our own mistakes and enables people to permanently display overconfidence.

Overconfidence and unrealistic optimism were conducive to underestimation of risk, particularly that the confirmation bias prevented certain warning signals that could have eroded investors' faith in the never-ending bull market from being

noticed. During the relatively long period of market prosperity investors got used to easy and high profits. As the result of the self-attribution effect many market players attributed the gained profits primarily to their own skills rather than to the general market situation. Investment successes intensified their confidence and encouraged them to take even higher risks.

Extrapolation error consists in attaching too much weight to past trends, particularly those observed during a relatively short period of time and in inadequately extending them onto subsequent future periods. An example of the extrapolation error is assuming the same sales or profits dynamics of a given corporation in long-term financial forecasts as that observed during the last several reporting periods, often without consideration for extraordinary events that could have affected the sales and profits levels only temporarily during the recent periods. It should be remembered that an Excel spreadsheet is only a tool for development of forecasts and that it accepts all values of dynamics that are entered into it. Extending a forecast onto several future periods with the assumption of a constant high pace of growth may lead to no less than absurd results. Psychological grounds for the extrapolation error are related to the representativeness heuristic and in particular its variation referred to as the short-series bias. It consists in premature conclusions and generalization of patterns on the grounds of too limited amount of observations (Gilovich, Vallone and Tversky 1985).

During the last bull market period people commonly committed the extrapolation error claiming that since the prices had been growing for a long time, the same trend was expected to continue. A claim was often heard that some types of investment simply could not bring losses. This was *e.g.* the case of the property market where the prices had been continuously growing for several decades. The situation was similar at the last stage of the economic boom in the commodity market. Many analysts argued publicly that price rally was justified by the intensified demand on the part of the dynamically developing Asian economies and that a price drop could not be expected in view of the limited worldwide resources.

Underestimation of risk was also fostered by people's tendency to treat unlikely things as if they were completely impossible and on the other hand to treat highly probable events as if they were to certainly occur. Hence, it was not accepted that an unfortunate coincidence of several macroeconomic factors may ultimately lead to a sequence of negative events that individually seemed very unlikely. Similarly, the risk of failure of positive developments that were assessed as highly probable and treated almost as a certainty was played down. The reality showed that the coincidence of such almost impossible situations not only came true but also proved to have colossal impact on the entire global economy.

People's inclination to exclude the possibility of occurrence of unlikely developments and simultaneously to treat highly probable scenarios as certain was empirically documented by Fischhoff *et al.* (1977), and theoretically it was also accounted for in the prospect theory of Kahneman and Tversky (1979).

4.5.3. Herding

At the time of the rapid growth of property prices followed by the price rally in the stock and commodity markets we were undoubtedly experiencing a speculative bubble, significantly affected by herd behavior of market participants. It is known that herding may occur both among irrational and rational investors (Devenow & Welch 1996, Bikhchandani & Sharma 2000, Hirshleifer & Teoh 2003).

During the period of the bull market the irrational players made decisions concerning the purchases of specific assets not on the basis of fundamental information but rather based on observations of earlier increase in prices, and imitating the behaviors of others. They would decide to invest, expecting further increases and ignoring the fact that the assets were already relatively expensive. Their motivation and way of thinking could be more or less recreated as follows: the price of assets goes up because people invest in them. Since others are buying that means that they are certainly assuming that the prices will rise even more and that profits can be made. Therefore, it's worth it to follow the market and join the game that bets on the continuation of the growth trend. The mechanism described below is referred to in the literature as the so-called feedback trading.

A relatively large group of similarly thinking players triggered the mechanism to start working as a self-fulfilling prophecy. More and more new investors were joining the upward spiral, generating yet another demand impulse and raising prices to new maximum levels. All this was fostered by the growing market euphoria and by the media publicizing a spectacular rise in prices and comments by experts.

Cutler, Poterba and Summers (1990) as well as DeLong, Shleifer, Summers and Waldmann (1990) previously presented feedback trading models describing such behavior mechanisms of irrational players. Additionally, DeLong *et al.* (1990) suggested that rational players can anticipate the presence of feedback trading among irrational investors and deliberately destabilize the prices. In other words, by anticipating the behaviors of irrational players rational speculators could decide in advance about purchasing a higher number of assets than would be dictated solely on fundamental grounds. Simultaneously, they would hope that in the future when the herding of irrational investors results in an increasing divergence from the true value, they will have enough time to sell the assets with profit.

Very favorable forecasts of analysts and comments of professional market players were also not without importance, although it is difficult to judge whether they gave in to the irrational mania or in their own opinion they were acting rationally. For example, Trueman (1994) argues that financial analysts, acting rationally in their own opinion, may aspire to publish forecasts and recommendations concurring with predictions of other analysts.

Even rational professionals may tend to get engaged in herding. Their actions may be based on the premises related to the fear of loss of reputation as the result of making claims that contradict the general market consensus (Sharfstein & Stein 1990), or on specific remuneration or evaluation terms (*e.g.* bonuses on inflow of new money to the funds under their management, bonus on achieved investment results, benchmarking of achieved results).

Generally, a hypothesis may be formulated that during the last bull market professionals were much more motivated to undertake actions focused on the continuing price growth rather than bet on decreases, even if they might have been aware of the fact that prices of asset categories exceeded the levels that could be justified on fundamental grounds.

Finally, it should also be noted that herding resulting in mispricing of assets could have also theoretically occurred even if all investors maintained complete rationality, as the result of the so-called information cascades (Banerjee 1992, Bikhchandani, Hirshleifer and Welch 1992). The lesser the amount and precision of the information available to the decision-maker or the more complex and difficult judgments to make, the greater tendency to ignore private signals and to copy behaviors of other players.

Lee (1998) presents a model in which large quantities of cumulated private information previously blocked as the result of a cascade could suddenly appear in the market as a reaction to a relatively insignificant event, creating an unexpected information avalanche and leading to sudden price changes. The model, although developed a long time ago, seems to fit well with the sudden market breakdown that followed the burst of the Internet bubble in 2000 and to correctly describe the events that occurred in the markets in 2008.

4.5.4.   Limited Rationality and Mistakes of Rating Agencies

During the last several-year period of global prosperity we witnessed a spectacular development of the derivatives market, not only with regard to the increasing volume of this type of transactions but also the degree of their complexity. Frequently, they constituted a complex and less obvious combination of many classic derivatives. At the same time, the clarity of the underlying assets that constituted basis for calculation of the derivative's value was decreasing. Increasingly often,

the value of the derivative depended on a specific industry index with a complicated structure and ambiguous rules of inclusion or exclusion of components and their weights. Derivatives for which other derivatives acted as underlying assets were often also created. Securitized mortgage portfolios increasingly often constituted a mixture of different quality debts, very difficult to evaluate by an external investor.

All this led to the situation in which it was not ultimately clear what the potential pay-off structure was and what factors actually affected its real value. Obviously, the human brain's perception ability and the ability to process numerous variables is limited. Therefore, even professional investors were forced to apply specific heuristics and simplifications in evaluation of individual financial products to a greater and greater degree. Many of them unquestioningly accepted recommendations and evaluations of rating agencies. It was also common to rely on the institutions that construed and defined parameters for yet newer base indexes which constituted basis for evaluating derivatives.

The last financial crisis confirmed the failure of rating agencies. They committed a number of mistakes, particularly with regard to the assessment of risk of mortgage-based financial products. Many of these mistakes might be explained on behavioral grounds.

By nature, loans drawn to purchase property are long-term liabilities. Meanwhile, to evaluate worthiness of mortgage debt portfolios rating agencies applied statistical data based on a relatively short historical sample, often going back only several or a dozen or so months. While assessing the risk it was wrongly concluded that since a small percentage of cases of failure to meet obligations was recently observed in a given category of borrowers, the situation was going to be similar during the entire lending period. It could be said that in that case rating agencies committed a type of the short-series error.

Rating agencies also believed that major diversification of debt within a given portfolio could practically eliminate the insolvency risk of an individual borrower. A certain analogy to the Markowitz portfolio theory (1952) could be found here. Just like in a well diversified portfolio of stocks it is possible to eliminate a unique non-systematic risk of an individual asset, also in the case of debt portfolio it was assumed that the possible insolvency of one of several hundred borrowers will not have any material impact on the total value of the specific group of mortgages. And hence, CDOs issued on the basis of securitized debt portfolios were assessed as safe and rated high.

At the same time, rating agencies committed a mistake of underestimating the systematic risk. It was reflected in the fact that a major number of borrowers could simultaneously, as the result of the same factors, find themselves in finan-

cial trouble and stop paying off their liabilities. When the unexpected system risk factors affected a relatively numerous group of borrowers, it certainly had an impact on the total value of an even well diversified mortgage portfolio. A coincidence of negative events that could materially affect the condition of numerous borrowers and shake the entire system was assessed as very unlikely or simply impossible in the minds of many. In that case, rating agencies fell victim to a psychological inclination consisting in treating events that are very unlikely as if they were not to take place at all (the previously mentioned non-continuity of the weighing function for low values of probability arguments in the prospect theory of Kahneman and Tversky 1979).

In their estimations, rating agencies also fell victim to the extrapolation error. This was because even if while assessing the instruments issued on the basis of debt portfolios it was assumed that a certain percentage of borrowers could be insolvent (the estimation of that value was still understated as the result of the above-mentioned short-series error effect), the final assessment of the portfolio quality still was based on the fact that the debt was secured by mortgages. It was commonly believed that a mortgage security is highly credible, as property prices could not go down. Therefore, for the purposes of risk assessment it was assumed that in the worst case scenario temporary liquidity difficulties may occur if borrowers stop making payments (that element was to be eliminated by the debt diversification) but practically the possibility of the ultimate loss of value of a portion of the debt was not assumed, since in the end it was always possible to reach out to an actual security which seemed to be offered by the mortgage. The error of extrapolation of a long-term growth trend contributed to a belief that property prices would not decrease in the future.

4.5.5.   Fear as Reason for Excessive Selling and Undervaluation

Fear and greed are two types of emotions that have opposing effects on investors' behavior. Depending on whether fear dominates or greed wins at a given moment, we will respectively observe an increase or decline in risk aversion.

In the times of the bear market it is fear that prevails among the investors. During the initial phase of the crisis fear turned into panic which intensified asset depreciation and fueled its extraordinary pace. Later, several sellout waves were followed by a slowdown in price drops, but the fear among investors with bitter experiences remained. It caused an inflow of capital to the categories of assets that are commonly considered very safe although not high-profit yielding (treasury bills and safe bonds, gold) and an outflow of funds from more risky markets, including naturally the stock market. During certain periods, when credibility of American banks was particularly strained and the market was dominated by the fear of bankruptcy, a particular economic paradox even occurred, whereby yields

for some of the American short-term treasury instruments were indicating negative values. In other words, investors were willing to buy securities guaranteed by the US Fed even assuming a slight loss only to be able to safely invest their capital in these assets.

Kahneman and Tversky (1979) theory claims, among others, that decision-makers are specified by risk aversion when they make decisions regarding profits (*e.g.* whether an asset that has yielded profits since it was purchased should be kept in the portfolio or sold), whereas with regard to losses (whether an asset whose price has dropped since it was purchased should be kept or sold) they tend to show aversion to realize losses, *i.e.* a tendency to take further risk. The different approach to risk with regard to profits and losses combined with the previously mentioned mental accounting effect, as the result of which, among others, investors mentally account their earned profits and incurred losses separately, is reflected in a higher tendency to keep in the portfolio the assets whose prices decreased since they were purchased rather than the stocks which when sold could generate capital earnings. Shefrin and Statman (1985) called it the disposition effect.

The disposition effect is usually used to explain the existence of short-term continuations of rates of return and the effectiveness of the so-called momentum strategy (Jegadeesh & Titman 1993, 2002, Grinblatt & Han 2005). In particular, aversion to realize losses may result in periodical limitation of supply and cause the fundamentally bad information to relatively slowly and gradually be reflected in the asset prices. Under normal circumstances of a relatively stable market the investors whose stocks went down would usually hope for the rates to go back up and are willing to wait rather than immediately sell the loss-incurring items. Very often as a consequence the market's reaction to bad news is spread over time and the price drops are gentler.

However, it seems that during the last financial crisis the disposition effect gave way to the panic-driven sellout. This hypothesis has not been precisely verified empirically, but it is supported by the scale and pace of quotation drops. Investors' emotions were dominated by fear and higher risk aversion which prompted them to get rid of value-losing securities as fast as possible and that added impetus the drop spiral.

The panic phase was followed by the phase of stagnation, during which fear prevented investors from returning to the stock market even though valuations of numerous corporations had depreciated and could seem attractive. The second phase of the bear market witnesses not so much rapid price drops as rather gradual further decline of quotations, interrupted from time to time by timid attempts at bouncing back. The characteristic feature of this phase is the relatively low volume of trading. Those investors who managed to wait through the panic

period and do not have to liquidate particular items for liquidity reasons are definitely less prone to sell stocks at very low prices. Hence, during the second phase of the bear market the disposition effect comes to prominence again.

4.6.   Conclusions and Final Remarks

In the finance literature of last two or even three decades there are many empirical findings which are at odds with the traditional perception of the capital market. In response to a growing number of market anomalies, behavioral finance emerged. This relatively new vein of finance delivers highly intuitive and convincing explanations referring to irrational behavior and psychological biases. In the context of recent market turbulences it has particularly gained in popularity (Szyszka 2010b). However, there are also doubts if behavioral finance, at least at current stage of development, may fully replace the neoclassical theory and be claimed as a new theory of capital markets.

Behavioral finance is affected by an ailment typical of relatively young and scarcely penetrated areas of knowledge. That is, a plethora of research carried out in an uncoordinated manner produced fragmentary outcomes that are difficult to cohere into a comprehensive theory. Issues related to investors' behavior and the way it affects valuation of assets are complex. Thus, researchers face much difficulty in specifying all the factors and relationships that describe the phenomena taking place in the capital market. However, limiting attention to selected aspects of the market leads to behavioral models that appear fragmentary and designed only to fit selected peculiarities.

Unlike behavioral finance, the complex and coherent neoclassical theory is replete with mathematical functions and equations that offer predictions of a normative character. This is the main advantage and beauty of well established and neatly designed area of knowledge. The major disadvantage comes from many strong assumptions and simplifications that lay at its foundations. Full rationality of all investors and no impact of psychological biases on asset prices are among those.

Unrealistic assumptions and simplifications are often unavoidable compromise on the way to build a formal theoretical model. They do not depreciate the theory, as long as the theory generally describes the reality correctly and it is not empirically overthrown. And, this is where the actual problem of the neoclassical paradigm of finance is. Empirical studies conducted on market data for the period when the keystone elements of the neoclassical theory where designed, that is from the end of the 1930s till the end of 1970s, generally did not reveal contradictive observations. Models seemed to be quite nicely fitted to the empirical data from that period. Empirical findings at odds with the neoclassical theory started popping up in the literature in 1980s, and intensify later over last two decades. In

terms of timing, studies on anomalies cover more or less the same period as the systemic changes discussed in the previous section of this paper.

Therefore, a hypothesis may be formulated that the neoclassical theory of finance lost its credibility (understood as an ability to describe the capital markets reality) due to systemic changes that have happened within institutions, markets, and instruments over the last three decades. The theory should be modified in line with dynamically changing financial environment. Among key elements that should be considered are globalization of financial markets, greater significance of institutional investors, including appearance of the new category of state controlled investors, higher cross-correlation between various categories of assets, monetization of new classes of assets, and increased volatility of almost all economic factors. In other words, the new modified theory of financial markets should take into account that we live in relatively smaller world (global village), but the world which at the same time is far more complex and dynamic.

In contemporary circumstances an interdisciplinary approach is needed in the search for an adequate theory. The neoclassical paradigm might be seen as an idealized normative benchmark. On the other hand, behavioral finance help explain deviations from this benchmark, showing how psychological biases may cause irrational behavior of investors. Behavioral approach is a valuable supplement when trying to understand financial markets. However, it would be of a greater usefulness if it allowed not only explain events *ex post*, but also if it delivered some normative tools for modeling the market and predicting behavior of investors *ex ante*. Perhaps the theory of finance should be also enriched by other disciplines of science than only psychology, for example neuropsychology, sociology, economic cybernetics, geopolitics. There is a lot to be done. Thanks to interdisciplinary cooperation of scientist we shall learn more about processes undergoing in global financial markets, and hopefully we shall be able to built a new coherent theory of finance, reflecting the complexity of contemporary state of affairs.

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5.   ON BASEL REGULATION AND BANKS' INCENTIVES

Rym Ayadi

Abstract

In view of Basel regulation deficiencies and to address the regulatory gaps identified during the financial crisis, the Basel Committee opted for fundamental revisions to strengthen global banking regulation and introduced fundamental changes under Basel III aimed at aligning bank incentives to regulation. This paper provides a critical assessment of the evolution of the Basel Committee role's and the rules it has produced – the so-called Basel I, Basel II and Basel III over the last decades, delves into how these rules impacted banks' incentives and concludes with some proposals for improvement.

5.1.   Introduction

Multi-billion euro losses suffered by the world's largest and most reputable financial institutions following the 2007 subprime lending crisis and other scandals have cast doubts on the credibility of banks' internal governance and risk assessment and management systems, the role of credit rating agencies in externally assessing the risk of complex structured products and the capacity of regulators to prevent financial crises. The market turmoil was a response to long-lasting excess liquidity coupled with flawed internal governance and risk management and inappropriate incentives, which in combination created a delusion in the financial markets that everything was possible. In less than one year, the global financial scene experienced episodes of liquidity dry-ups, disruptions in inter-bank lending, a general loss of confidence in asset-backed securities, bank runs. Facing these serious consequences of ill-considered risk-taking, central banks across the Atlantic indulgently stepped-in to prevent worse scenarios from unfolding. Despite heroic central bankers' actions including maintaining interest rates at their lowest levels, quantitative easing, flooding the markets with liquidity facilities etc the global financial and economic disaster was hardly avoided and large bail-outs were inevitable.

In a period of protracted turbulence, it is only human nature to seek a 'culprit'. Although credited with having achieved a certain level of convergence of capital adequacy across the globe, Basel I adopted in 1988, failed to achieve its chief purpose which was to strengthen the capital base of the banking system. In particular it failed to adapt to market developments and, more dangerously, created perverse incentives and ultimately contributed to the delusions suffered by the financial market participants. The use of broad-based risk buckets without taking

account of relative risk, the focus on a single credit risk indicator, outdated treatments of securitisation and trading book risks, the zero-risk weight, short-term stand-by credits and the cap on the counterparty-risk weight for swaps and forward contracts spawned an army of financial engineers and encouraged many of the imprudent practices that are being ruthlessly exposed by an extreme reassessment of credit counterparty risk.

Seeking to address the weaknesses of Basel I, the Basel Committee's sustained efforts and resources for more than a decade managed in producing the so-called 'Basel II' Accord which was issued in 1999. Basel II was thought to be an evolutionary and flexible approach to banking regulation and supervision, which would reflect the rapid progress and sophistication of banking practices and risk-management techniques, including securitisation. It sought to align supervision and regulation with market developments and to provide incentives for banks to continue improving their internal risk-management capabilities and to enhance corporate governance and disclosure. It was also intended to give supervisors a number of tools to enable them to react to emerging developments, thereby reducing the regulatory arbitrage opportunities that Basel I created. However, Basel II suffered major weaknesses, which were inherent to its design and hence failed to address the underlying problems of the 2007 financial crisis. The over-reliance on poorly performing quantitative risk measures provided by external rating agencies and banks' internal models, the low levels and poor quality capital, the imbalance and weak interaction between its three pillars and the inherent flaws in the treatment of securitisation and trading book instruments are only some of its weaknesses.

The 2007 financial crisis equally revealed that authorities are ill-equipped to monitor complex and risky activities of large cross-border institutions, not only due to insufficient resources and capabilities but also because of lack of relevant information about banks, poor information exchange and cooperation in both stable and crisis situations.

In view of these deficiencies and to address the regulatory gaps identified during the financial crisis, international policy makers and regulators have opted for a fundamental revision of the Basel II accord to strengthen global banking regulation and introduced fundamental changes in Basel III.

This paper provides a critical assessment of the evolution of the Basel Committee role's and the rules it has produced – the so-called Basel I, Basel II and Basel III over the last decades, delves into how these rules impacted banks' incentives and concludes with some proposals for improvement.

5.2.   The Evolving Role of the Basel Committee on Banking Supervision (BCBS)

Created in 1974 by the G-10 central bank governors, the main aim of the Basel Committee on Banking Supervision (BCBS) has been to serve as an international forum for cross-border cooperation on banking supervision. Although the Committee has no formal authority, its proposals and standards have served as the blueprint of banking supervision for the past three decades. The original membership base, comprising of industrialized nations, has been expanded substantially in 2009 in the aftermath of the financial crisis with the addition of several emerging G-20 economies[1]. With these additions, the current members of the institution increased to 27 jurisdictions, represented by heads of the national supervisory authorities or senior officials[2].

Originally, the Committee was established as a club of bank supervisors from the developed G-10 economies to agree on the regulatory and supervisory standards that would be applicable for the internationally active banks. By the late 1990s, the BCBS's role changed from an informal club of supervisors to a global legislator for prudential standards applicable to banks.

In 1997, it developed the "*Core Principles for Effective Banking Supervision*", which has become the gold standard on sound banking supervision, incorporated into Financial Sector Assessment Program (FSAP) of the IMF and the World Bank. Perhaps more importantly, BCBS served a vital role in developing the global capital adequacy standards under the Basel I (1988) and Basel II (2004) Accords. In addition, the BCBS has also addressed topical issues of significant supervisory interest, including accounting, auditing as well as credit, liquidity, market and operational risks.

The Committee's first public response to the crisis came in 2008, with the publication of documents outlining the challenges and principles on liquidity risk management[3]. Although an outcome of a pre-crisis working group established at the end of 2006, the severe funding stresses faced by global banks heightened the importance of updating and strengthening the global approach to liquidity regulation. However, the documents only served to update the BCBS's 2000 guidelines

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[1]   The original members of the BCBS comprised of the G-10 countries – *i.e.* Belgium, Canada, France, Germany, Italy, Japan, the Netherlands, Sweden, the United Kingdom, and the United States – plus Luxembourg, Spain, and Switzerland, where the hosting and funding institution, Bank for International Settlements (BIS), is established. The BIS also provides the secretariat for the BCBS. In 2009, the membership base was more than doubled with the addition of 14 emerging economies, including Argentina, Australia, Brazil, China, Hong Kong SAR, India, Indonesia, Korea, Mexico, Russia, Saudi Arabia, Singapore, South Africa, and Turkey.

[2]   The current members include Argentina (since 2009), Australia (2009), Belgium, Brazil (2009), Canada, China (2009), France, Germany, Hong Kong SAR (2009), India (2009), Indonesia (2009), Italy, Japan, Korea (2009), Luxembourg, Mexico (2009), the Netherlands, Russia (2009), Saudi Arabia (2009), Singapore (2009), South Africa (2009), Spain, Sweden, Switzerland, Turkey (2009), the United Kingdom and the United States.

[3]   The BCBS's response to liquidity challenges, as posed by the crisis, has culminated into two reports: BCBS (2008 a, b).

on liquidity risk management and stopped well short of introducing new standards.

Responding to a mandate for banking sector reforms from G-20 leaders in the September 2009 Pittsburgh Summit, headed most notably by the newly-elected Obama Administration, the BCBS developed standards in December 2010, collectively referred to as the Basel III Accord[4]. The new framework supplemented the capital adequacy standards by requiring banks to hold more loss-absorbing capital, introducing new capital buffers and leverage ratio requirements and strengthening the risk coverage of specific securitization, trading and derivatives activities, counterparty credit, and exposures to central counterparties. In addition, a new global framework for liquidity requirements (*i.e.* liquidity coverage and net stable funding ratios) and monitoring standards were also put forward for the first time. Under the rules, the standards will be phased in relatively gradually to allow the banking sector to "move to the higher capital and liquidity standards while supporting lending to the economy."[5]

Since December 2010, the BCBS has also addressed a number of topical issues relevant for the framework. To give several notable examples, in close cooperation with the Financial Stability Board (FSB), the Committee addressed in November 2011 the cross-border externalities created by global systemically important banks (G-SIBs) by proposing a set of measures for identifying (or 'bucketing') such institutions and to increase their capital buffers, where necessary[6]. Later, by December 2011, the BCBS published a consultative document on the capital disclosure requirements to supplement Basel III's Pillar 3 requirements, aiming to ensure a minimum level of comparability in capital-related information between jurisdictions[7].

Several issues may be highlighted regarding the changing role of the BCBS over the years.

First, ever since mid-1990s, the Committee has encouraged and facilitated the formation of groups of regional banking supervisors, including not only emerging countries but also some offshore jurisdictions. Despite these efforts and the recent enlargement of the Committee's membership base, the effective role and incentives of emerging economies to contribute to global standard-setting remains limited which led to substantial delays in implementation of the global rules. In addi-

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[4]   The Basel III framework is summarized in two documents: BCBS (2010 a, b). Both documents, consultation results and the quantitative impact studies are available at www.bis.org/bcbs/basel3.htm.

[5]   Reference from www.bis.org/press/p101216.htm.

[6]   BCBS (2011a).

[7]   Accordingly, the Committee has proposed a uniform disclosure template for capital after 2018, following the phasing-in period for the specific regulatory adjustments (*i.e.* goodwill, intangibles, deferred tax assets, etc.) to Common Equity Tier 1 capital, introduced under Basel III. The proposal also requires institutions to reconcile and map the figures and definitions reported in the template and the original financial reports made available under Pillar 3 reporting. Interestingly enough, however, the proposed disclosure requirements fail to specify disclosure requirements for the risk-weighted assets. For more, see BCBS (2011b).

tion, the growing level of complexity of the rules (since the publication of Basel II) which is a result of the growing sophistication of the banking practices in the developed nations makes it more difficult to emerging economies to justify the needs and the investment to implement these rules. According to BCBS's October 2011 monitoring results, five of the newer members (and the US) are behind in the full implementation of the Basel II standards[8]. As regards the Basel III framework, a draft proposal was only published in the EU[9] and is unlikely to be proposed in other jurisdictions before later in 2012 and possibly beyond.

Second, the Committee has been often criticized for reaching its decisions behind closed doors, lacking diversified expert opinion, public involvement, or a critical approach incorporating ideas from the legal, economic, finance, and international relations fields. The measures put forward by the BCBS are ultimately agreed by its governing board, or the Group of Central Bank Governors and Heads of Supervision, through consensus. In turn, the BCBS's secretariat is comprised of 17 staff members, mostly seconded officers from the 13 original members, including most notably the Committee's secretary general. Interestingly, the BCBS may indeed be one of the rare organizations that proposes, rubberstamps, and assists the implementation of legislation worldwide, all at the same time. Furthermore, the lack of transparency may indeed increase the likelihood of regulatory capture and politicization of the global regulatory standards. Indeed, the increased politicization is evident from the fact that the call for new regulations had to come from the G-20 and not the BCBS in of itself in the aftermath of the recent crisis.

Third, the lack of external expert opinion and transparency in the early design-phases may contribute to a narrow approach to regulation. For example, although the Committee pushed global standards on capital adequacy requirements ever since the Basel I Accord in 1988, it has failed to address some of the key challenges, including liquidity risks, systemic risks, and the absence of resolution schemes for international banks. All of these issues remain within the remit of the BCBS and, although some recent headway, especially in liquidity requirements, the progress up-to-date remains incomplete and too simplistic. For example, cross-border resolution issues have been partly addressed by a generic set of general and largely nondescript recommendations[10]. On systemic risk, the indicators used to identify systemically important banks (G-SIBs) rely extensively on

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[8] According to the October 2011 results of BCBS's monitoring effort, full implementation of the Basel II framework remained incomplete in Argentina, China, Indonesia, Russia, Turkey, and the United States. For more, see the latest monitoring report at www.bis.org/publ/bcbs203.htm.

[9] After the adoption by the European Commission of the Proposal on Capital Requirements Directive and Regulation IV.

[10] BCBS (2010), *Report and Recommendations of the Cross-border Bank Resolution Group*, March, available at www.bis.org/publ/bcbs169.pdf.

size and not on sophisticated measures of inter-connectedness among financial institutions.

Fourth, the rules produced by the BCBS are not legally binding; they are simply best practices that are produced on a consensual basis. Their implementation by the BCBS members' countries is voluntary and subject to national and regional specificities which dilute the original objective of the BCBS which is to ensure more convergence on banking regulation world-wide.

In short, due to its limited resources, narrow interests, and lack of authority and transparency, the BCBS is likely to produce loosely followed guidance on regulation. The recent developments clearly warrant a gradual shift to the creation of global institutions with the power to propose and enforce regulations including all version of Basel independently. The BCBS's current soft-law, principle-based approach is unlikely to produce that result. Instead, the Committee will likely be used increasingly as a political tool, representing the politically-oriented ideals of its most active members subject to the reluctance and aversion of others. Such a prospect would loosen its credibility and hence the credibility of the rules it produces.

5.3.   Basel Capital Requirements as Essential but not Sufficient Regulatory Tool

Two justifications[11] are often adduced for regulating banks: the risk of a systemic crisis[12] and the inability of depositors to monitor banks[13]. Here comes the role of deposit insurance and its associated costs since it leads to moral hazard. When it is not fairly priced, deposit insurance gives banks an incentive to increase risk, which they can pursue by increasing the risk of their assets and/or their leverage. This risk-shifting incentive, together with the potential externalities resulting from bank failures, has been one of the main justifications for regulating bank capital[14].

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[11] For other rationales for regulating banks, see Goodhart *et al.* (1998).

[12] According to Diamond & Dybvig (1983), a bank's provision of liquidity services leaves it exposed to runs. For example, if depositors panic, they may try to withdraw their funds out of fear that other depositors will do so first, thus forcing an otherwise sound bank into bankruptcy (witness the recent case of Northern Rock). Furthermore, in an environment of asymmetric information, a bank run may trigger contagion runs, which can culminate in a system failure (Aghion *et al.*, 1999), showing how the failure of one bank may trigger a contagious run on other banks in a model with multiple competing banks and an interbank market.

[13] Dewatripont & Tirole (1993a, 1993b) propose a rationale for banking regulation – the representation hypothesis – that builds on the corporate governance problems created by the separation of ownership from management and on the inability of depositors to monitor banks. The point of departure of their argument is that banks, like most businesses, are subject to moral hazard and adverse selection problems Therefore, it is important that investors monitor them, but that is an expensive activity and requires, among other things, access to information.

[14] For an extensive review of the literature, see Santos (2000).

In the wake of the 2007-08 crisis, another justification to further regulate banks relates to the implicit guarantee that was heavily enacted through government bail outs, enhancing moral hazard and leading to more incentives to risk shifting.

However they may be justified, the central aim of the Basel regulations is to require banks to hold more capital to absorb any shocks and reduce the likelihood of insolvency. Studies have shown that requirements to hold a *fixed level* of capital often leads to ambiguous results and may even harbour more risk-taking. Kahane (1977), Koehn and Santomero (1980), and Kim and Santamero (1988) illustrate that some banks may attempt to offset their losses from higher capital levels by increasing their portfolio risks. Other studies have shown that fixed capital requirements may increase or decrease risk, depending on the size and the level of capitalization of the bank, (Furlong and Keeley, 1989; Gennotte and Pyle, 1991; Calem and Rob, 1999)[15]. Shrieves and Dahl (1992) use a sample of US banks in mid-1980s when fixed-capital requirements were in effect. The authors find that increasing capital is associated with a greater portfolio risk although there is evidence that the results is partly attributable to the owners' or managers' private risk preferences and do not arise from binding regulatory requirements.

Faced with both theoretical and empirical support that fixed capital requirements have might increase bank risks, attention turned in 1980s to risk-sensitive measures, which is one of the key properties of Basel regulations. In an early work, Sharpe (1978) shows that when designed 'correctly', risk-sensitive capital requirements can reduce bank risks exactly in the way that risk-based insurance premiums do. Similarly, Rochet (1992) illustrates theoretically that the incentive to take more risks to counteract the losses from holding greater capital can be addressed by properly designed risk-sensitive capital requirements.

Turning to empirical studies, Jacques and Nigro (1997) examine whether the introduction of risk-based standards under the Basel Accord in 1991 had an impact on portfolio risk of US banks. The authors find that significant increases in capital ratios lead to drops in risk exposures, although once again there are questions on whether these behavioural changes can be fully attributable to regulatory changes. Aggarwal and Jacques (2001) study the bank-level data from the same period and to showing that banks responded to the introduction of the prompt corrective action (PCA) provisions by increasing their capital ratios and lowering their portfolio risks[16].

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[15] In a related vein, Diamond and Rajan (2000) argue that although a greater level of capital leads to a less risky asset portfolio (at least in the short-term) it may reduce the ability of banks to create liquidity and may encourage banks to liquidate loans sooner, reducing the amount they collect and their ability to fulfill their deposit obligations.

[16] Using the option pricing framework, Furlong (1988) and others find little evidence that the introduction of Basel I rules have led to increased risk-taking, although these results are put to question as the studies make no attempt to control for other reasons that might have cause risk-taking to differ, (Stolz, 2002).

In practice, bank prudential supervisors, who are responsible for financial stability, have the important task of ensuring that banks (notably systemic and too big to fail banks) maintain an adequate fixed cushion of capital (Box 1) and liquidity that takes account of the potential for risk assessment and management failures, particularly during times of stress. So far, minimum capital requirements are a major (only) tool for maintaining an adequate cushion to absorb losses that would otherwise cause the failure of a bank. However, although a minimum level of capital was maintained over years, history has shown the grim reality of the banking industry tainted with worldwide failures and fiascos[17] arising from different sources of risks and heavy exposures to risky portfolios coupled with risk mismanagement.

Box 1. What is capital in a regulatory context?

In the regulatory context and according to BCBS (1988), capital is defined on a two-tiered basis:
– *Tier 1 capital* (or core capital) includes stock issues (shareholders' equity) and disclosed reserves. Disclosed reserves can take the form of loan-loss reserves set aside to cushion future losses and smooth out income volatility;
– *Tier 2 capital* (or supplementary capital) includes perpetual securities, unrealised gains on investment securities, hybrid capital instruments (*e.g.* mandatory convertibles), long-term subordinated debt with maturities greater than five years and hidden reserves, such as excess allowance for losses on loans and leases. The total of tier 2 capital is limited to a maximum of 100% of the total of tier 1 capital.

The 1995 framework (BCBS, 1995) also provided – at the discretion of national supervisors – for a third tier of capital consisting of short-term unsecured subordinated debts that can only be used for meeting market-risk capital requirements.
The BIS press release of October 1998 provided stringent conditions for the inclusion of innovative capital instruments in tier 1 capital. These instruments will be limited to a maximum of 15% of tier 1 capital.

Source: BCBS (1988, 1995, 1998 (press release)).

Among the risks that a bank must manage adequately, credit risk[18] is fundamentally important particularly when a bank focuses on traditional retail and corporate activities. Moreover, a bank must manage market risk[19] when it deals with securities and bonds in its balance sheet, operational risk[20] when it relies heavily

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[17] In 1995 the UK's oldest merchant bank, Barings, also known as the 'Queen's bank', went bankrupt as a result of the embezzling actions of a single trader based at a small office in Singapore and the incapacity of the risk-management team to avoid the worst consequences. In 2007-08, several highly reputed global and regional banks suffered hefty write-downs and losses due to inconsiderate exposures to the US subprime market and related poor risk management, control and governance.

[18] Credit risk is the risk of loss due to the failure of the counterparties to meet their obligations as stated in a loan contract.

[19] Market risk is the risk of loss owing to a change in market prices, such as equity prices, interest or exchange rates.

[20] Operational risk is the risk of loss resulting from inadequate or failed internal processes, persons or IT systems, or from external events.

on information technology and human resources, liquidity risk[21] (market and funding[22]) when it relies on the market to secure funding of its operations, concentration risk[23] when it deals with large exposures and other types of risk[24] such as counterparty credit risk[25], reputation risk, business risk, interest rates risk, pricing and correlation[26] risks due to flaws in modelling and data collection and systemic risk when banks are of systemic importance and thus pose serious threat to financial stability when they are mismanaged. The interaction between these risks is very important as well in the overall risk measurement and management framework of a bank.

A bank that manages some of these risks is required to hold capital, to manage its liquidity, to limit its leverage and to provide a buffer against unexpected losses. The retention of sufficient capital decreases the likelihood of a bank becoming insolvent and reduces the negative impact of bank failure through its loss absorption capacity and ensures increased public confidence. It is important to notice though that holding capital does not eliminate the probability of failure. High capital adequacy ratios do in themselves not guarantee the bank's soundness, particularly if all types of risks have not been adequately measured and managed at an individual and wide-firm level[27], or the risks being taken are not fully identified[28] or the bank is misgoverned[29].

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[21]   Liquidity risk is a risk of not maintaining or generating sufficient cash resources to meet payment obligations in full as they fall due, or can only do so at materially disadvantageous terms.

[22]   The recent episode of Northern Rock revealed the importance of managing liquidity risk, which is not taken into consideration under Basel I.

[23]   Concentration risk is the risk when an exposure has the potential to produce losses large enough to threaten a financial institution's health or ability to maintain its core operations.

[24]   The management of a number of these risks proved to be rather weak during the market turmoil that began in 2007. See BCBS (2008).

[25]   As mentioned by BCBS (2008), counterparty risk measurement has always acknowledged a concern with so-called 'wrong way' exposures, namely, those exposures that are likely to be largest precisely when the counterparty's creditworthiness is lowest.

[26]   Correlation risk exists in many credit risk transfer (CRT) products, such as CDOs (collateralised debt obligation). These are structured based on assumptions about the degree of diversification of an underlying portfolio. An estimate of the correlation of defaults among the exposures in the portfolio is a key input into a model used to design, value or risk-manage CDOs. The statistical concept of correlation refers to the average co-movement of two assets or prices over time. But often what matters for the performance of more senior CDO tranches is the worst-case co-movement, because that generates the largest losses in the underlying portfolio. This is especially true for the senior part of the CRT capital structure, which only suffers a loss when the losses in the underlying portfolio are very large. This difference between average and worst-case correlation can be difficult to incorporate into models and difficult for market participants to understand. It is important to mention that for ABS CDOs, the correlation parameters in the rating agencies' models were not derived from any empirical data, due to the short data history available on the default history of the underlying subprime residential mortgage-backed security (RMBS). For more discussion on the sensitivity of senior tranches of ABS CDOs to correlated, economy-wide shocks, see BCBS (2008).

[27]   In the case of Northern Rock, the bank was apparently solvent but a poor liquidity risk management was exacerbated by market liquidity dry-ups, which triggered the bank run and in order to avoid a subsequent failure, the bank was nationalised.

[28]   As recognised by the Committee on Market Best Practices of the Institute of International Finance (IIF, 2008), certain risk management practices and methodologies failed to identify the real risk profile of structured financial instruments.

[29]   In this respect, supervisors should consider a bank's capital adequacy in the context of a broader set of factors, including a bank's corporate governance. The BCBS (1999) clearly recognised the importance of a sound corporate governance system as a condition for a well functioning banking supervision. In 2006, the Committee published an updated guidance paper (BCBS, 2006), containing eight clear principles for a sound corporate governance framework.

The 2007 financial crisis[30] showed that many banks and securities firms seemingly operating well above minimum regulatory requirements entered in serious distress because of lousy risk assessment and measurement and governance systems, leading to a wave of write-downs, unexpected losses, share prices plunges and ultimately bail-outs with tax payers' money. The bottom line is that regulatory 'good quality' capital is an important factor of a bank's general condition and a sound signal to financial markets but it is not the only one. Therefore, if well designed, the minimum capital requirements provide one essential prudential regulatory instrument that could be efficiently used as a defence line in case of distress. Holding capital[31] (whatever its level and quality of capital instruments) without a comprehensive and integrated risk assessment and management framework at the institution-wide level, without an appropriate management of leverage, without an adequate and ethical corporate governance rules at all levels of the organisation and without a credible threat from the market and supervisors may not be sufficient and may still expose a bank to a failure with all subsequent costs to the tax-payers and the economy.

Basel I was the first step forward in capital regulation. However, this framework has proved to be too simple to address all types of risks and the inherent complexities of large banks' activities, particularly securitisation. In addition, the definition of capital adopted by then (Box 1) was simply too lax as the loss absorption capacity of some capital instruments in Tier 2 is weaker than the capital instrument in Tier 1. As a partial response to the limitations of Basel I, the Basel Committee on Banking Supervision (the Committee) released a more updated Accord (the so-called Basel II) in 2004 that reflects the changes in the structure and practices of banking and financial markets, by giving more flexibility to banks to compute their risk weighted assets (RWA), by either using external ratings or their own internal models, without amending the definition of capital. Soon after, the financial crisis hit global financial markets and confirmed the inherent flaws in the original and the updated framework. However, the Basel Committee continued to fall short against the expectations to seriously address the major weaknesses of the framework amidst the global political pressure that followed the major trillions' banks bails outs.

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[30]   Triggered by a sharp loss in the value of subprime mortgages and related mortgage-backed securities and the deterioration of investors' appetite during the summer of 2007. For more extensive discussion on the factors underlying the market turmoil, see FSF (2008).

[31]   When looking at the history of banking capital ratios in the US over the past 100 years, the ratio of equity to assets has fallen remarkably. In 1840, equity funded over 50% of banks' assets, after which the ratio fell fairly steadily for about 100 years until it settled in the 6% to 8% range from the mid-1940s until today. The aggregate equity/asset ratio rose from 6.21% at the end of 1989 to 8.01% at the end of 1993, an increase of almost 30% in four years due to combined effects of various US regulatory actions including Basel I. See Berger *et al.* (1995) for a more extensive discussion on the role of capital in financial institutions. Nowadays, capital ratios only account for certain types of risks (particularly credit risk), which is necessarily the reflection of modern banking activities.

5.4. From Basel I to Basel III: What has Changed?

5.4.1. Basel I: the First Step towards Banking Regulation

The Basel Capital Accord (Basel I) – the international framework on capital adequacy – was adopted in 1988 by a group of central banks and other national supervisory authorities working within the BCBS. Led by the Americans and the British[32] the 1988 Accord[33] sets out details for measuring capital adequacy and the minimum standards for its implementation into national laws of the G-13 member countries by December 1992. The Basel I Accord had two fundamental objectives, namely: to "strengthen the soundness and the stability of the international banking system"[34] by creating common minimum capital adequacy requirements for internationally active banks to set aside a capital cushion for the amount of risk taken; and to create a level playing field among international banks by establishing that the framework should be fair and consistent in its application to banks in different countries. The original framework assessed capital mainly in relation to credit risk and addressed other risks (such as market risk, liquidity risk and operational risk) only *implicitly* – it effectively loaded all regulatory capital requirements into insensitive risk measures of credit risk that does not reflect the risk profile of banks.

Specifically, the 1988 two-tiers capital framework requires banks to hold capital known as 'regulatory capital' through the combination of equity; and other instruments including loan-loss reserves, subordinated debts and some other instruments, equal to at least 8% of all the risk-weighted assets[35] (RWA) (such as loans and securities) and asset-equivalent off-balance-sheet exposures (such as loan commitments, standby letters of credit and obligations on derivatives contracts) in their portfolios[36]. This measure has finally allowed the provision of a common and relatively comparable measure of solvency known as the 'Cooke ratio' (Table 1).

Table 1: Regulatory capital in selected countries in 2005

	France	Germany	Italy	Spain	UK	US
Regulatory capital to risk-weighted assets	11.41%	12.15%	9.97%	12.43%	12.76%	12.79%
Regulatory tier 1 capital to risk-weighted assets	8.25%	7.96%	7.32%	8.01%	8.91%	10.69%

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[32] Kapstein (1991).
[33] See BCBS (1988).
[34] *Ibid*.
[35] Half of which 4% had to be in the form of tier 1 capital.
[36] In addition to on-balance-sheet activities, the Basel framework takes into account the credit risk of off-balance-sheet items by applying credit conversion factors to the different types of off-balance-sheet assets, so that they can then be treated as on-balance-sheet items.

The assignment of risk weights is based on the perceived credit quality of an individual obligor and each off-balance-sheet exposure is converted to its equivalent amount of asset and then weighted accordingly. Four broad categories of capital charges are set by the Basel I Accord following six months of consultation with the banking industry: a) government exposures with OECD countries receive 0% credit-risk capital charges; b) OECD banks and non-OECD governments receive a 1.6% capital charge (which corresponds to a risk weight of 20%); c) mortgages receive a 4% capital charge (which corresponds to a risk weight of 50%) and; d) other remaining exposures such as those to other banks and all corporates including SMEs receive a capital charge of 8% (which corresponds to a risk weight of 100%). Later on, the 1996 amendment[37] to the Basel Capital Accord extended the initial requirement to include risk-based capital adequacy for market risk in the trading books of the banks with very low amount of required capital.

Basel I had indirectly guided international banks to allocate financial resources. Banks were given clear and powerful incentives to invest in government securities (zero to very low risk charges), no matter what could be the real risk profile of these exposures and were more encouraged to be exposed to the mortgage market than to the SME and unrated corporate segment. These regulatory treatments have initiated the wrong incentives and sowed the seeds to larger future problems in the mortgage market in the US and in sovereign debt market in Europe.

Over time, the inherently-flawed Basel I succumbed to market developments and its growing sophistication and complexity. Dangerously it has created perverse regulatory incentives to move exposures off the balance sheet and excessive use of derivatives to avoid the capital charges on credit risk.

The 'over' simplified and partial approach inherent in its architecture only accounted for credit risk, while omitting voluntarily many other risks that are more important in today's banking business. For credit risk, the use of only four broad credit risk-weighting categories for capital charges does not provide enough granularity in the measurement or distinction of different levels of credit risk and other risks embedded in banking portfolios, especially to address the activities of the most complex organisations. This limited differentiation among degrees of risks means that calculated capital ratios are often uninformative and may provide misleading information about a bank's capital adequacy relative to its real risk profile. The limited differentiation among degrees of risks, created *incentives for banks to engage in 'gaming'* through regulatory arbitrage provided by asset securitisation and other innovative financial vehicles including credit derivatives (credit derivatives swaps, collateralised debt, loan, notes obligations and alike). The general idea behind these new instruments is to allow banks to

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[37]   BCBS (1996).

trade their credit risk exposures in order to transfer the risk to other financial actors in the market[38]. In other words, thanks to these new instruments, banks tend to trade exposures for whatever regulatory capital requirement is higher than what the market requires. As an example, residential mortgages are types of assets that banks securitised in large volume because they believe the required regulatory capital would be greater than economic capital[39]. As a consequence, asset securitisation has rendered the 1988 Accord's minimum capital requirements ineffective as a tool to maintain adequate regulatory capital against the real risk taken. Through asset securitisation, banks have been able to significantly lower their credit risk-based capital requirements without reducing the actual credit risk embedded in their banking portfolios, as the recent crisis in the credit derivatives market has demonstrated.

5.4.2. Basel II and Basel III: Does a Flexible and Sophisticated Approach to Banking Regulation Regulate Banks' Incentives

Since 1998, the BCBS has been engaged in a revision process of the 1988 Capital Accord in an extensive consultation process with the banking industry from 2001 to June 2004 when the new Basel Capital Accord (Basel II) was formally released. The implementation of the new Accord has been gradual and probably too late to enable an informed assessment of its effectiveness during the crisis. In January 2007, European banks applied the simpler standardized approaches and in January 2008, the rest applied the more advanced. US banks instead did not apply Basel II.

Basel II introduced an evolutionary, more flexible and more complex risk-sensitive approach to banking regulation and supervision, which reflects a response to the weaknesses of the Basel I Accord and the rapid progress and sophistication of banking practices and risk-management techniques. It significantly refines the framework's risk sensitivity by avoiding cross-subsidisation and thus requiring higher (lower) levels of capital for high-risk (low-risk) borrowers according to the external risk inputs from external rating agencies or from the inputs of banks' internal models. It also allows for the treatment of risk mitigation techniques and securitisation which have been in use by banks over the past years. In addition, the updated framework provides ruled for market disclosure and therefore supports market discipline and finally it offered guidance on the supervisory review of banks' risk assessment and management practices. The new aspects introduced by Basel II are structured around three mutually reinforcing pillars (diagrammed in Figure 1):

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[38] See Ayadi & Behr (2008).
[39] An economic capital framework allows banking institutions to derive a return on equity objective into individual transaction decisions through risk-based pricing. Risk-based pricing can be a key competitive differentiator.

–   Pillar 1: minimum capital requirements.
–   Pillar 2: supervisory review.
–   Pillar 3: market discipline.

Figure 1: An overview of the new Basel framework
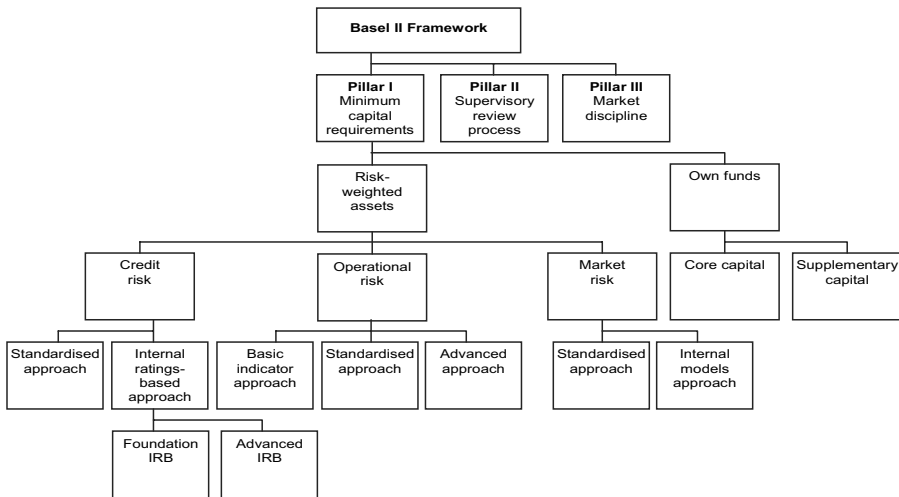
The computation of the minimum supervisory capital under the first Pillar is based on the simple sum of the capital requirements originating from: 1) credit risk, 2) market risk and 3) operational risk (see Box 2). Such approach assumes a linear and static nature of risk, which makes it largely flawed and subject to serious contention.

Box 2. The capital ratio under Basel II

Regulatory capital (definition unchanged)

Risk-weighted assets *(measure revised)* *

= Minimum required capital ratio *(8% minimum unchanged)*

Credit risk exposure (measure revised) + **market risk exposure (measure unchanged) + **operational risk exposure** (explicit measure added)*

To estimate the minimum required capital, a variety of approaches are available to banks. These include the standardized, in which risk charges are chiefly provided by external credit ratings agencies and the internal rating based (IRB) produced internally by banks, are available for banks. The standardised approach provides simplicity to banks which do not have the necessary risk measurement and management capacities to qualify for the advanced approaches. These banks thus rely on risk charges provided by external rating agencies to compute their risk weighted assets. Operating under this approach weakens banks' incentives to

upgrade their risk measurement and management systems and therefore creates a 'second-best' tier of banks whose risk is not managed at its optimum level. This approach delivers partial risk sensitivity only if all corporates are rated[40] and if their ratings properly reflect their risk profiles. Unrated corporates are expected to face the same risk charges as in the Basel I Accord. Therefore there is a strong expectation that highly risky exposures will be better off in terms of capital charges when they are simply unrated. In an extreme-case scenario, banks opting for this 'somewhat adverse' behaviour would be inclined to specialise in highly risky portfolios. In addition, if their business models coincide with the 'originate and distribute' model type, then a widespread market impact will be a repetition of the 2007 financial turmoil. This perverse incentive may be overcome by enhancing the incentives to broaden ratings to un-rated companies. Importantly on the demand side, since unrated companies incur a lower risk weight than companies rated B and below, using the standardised approach may create negative incentives for risky companies to prefer forgoing ratings to obtain cheaper finance[41]. Such behaviour may be encouraged by the emergence of private rating assessment services providers, which perform confidential ratings for companies without committing to make the results public. This creates an incentive to shop around for better ratings.

Similar to the standardised approach, the IRB approaches[42] distinguish between asset classes (sovereign, bank, corporate[43], retail[44] and equity exposures) to which different supervisory risk weight functions apply. If a bank chooses (and is allowed by the national supervisor) to create its own rating system (instead of depending on external agencies), the capital against each credit exposure will be a function of four basic risk parameters: *the probability of default*[45] *(PD), the loss*

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[40] Small- and medium-sized enterprises are generally not rated.

[41] Ayadi & Resti (2004) and Danielson *et al.* (2001).

[42] The IRB approaches are derived from the academic work of Gordy (2003) on credit risk modeling. Its theoretical basis is the asymptotic single risk factor (ASRF) model of credit risk. According to this model, default occurs when a borrower's assets do not cover its debt. The corresponding measure of credit risk within a certain time frame (commonly set at one year, also in Basel II) is the probability of default (PD). The ASRF model implies that it does not take into account borrowers' idiosyncratic risks, *i.e.* risks that can be diversified in the bank's loan portfolio. Instead, the model measures the marginal risk contribution of an exposure that it would add to an already well diversified portfolio. In this respect the IRB approach differs from models that some banks apply internally which measure a loan's risk contribution to a bank's actual portfolio, inclusive of a potential additional diversification effect achieved by adding an exposure to this specific borrower (the 'credit risk portfolio model'). The IRB approach therefore contains a deliberate simplification compared with the most advanced techniques currently applied. This simplification allows for a model that is standardised and can be applied uniformly to banks of different sizes and portfolio compositions. The horizon of the risk assessment is set at one year. The IRB model also assumes a 99.9% confidence level. For more details, see Resti (2002).

[43] Broken down into exposures to small- and medium-sized enterprises, specialised lending, purchased receivables and other corporate exposures.

[44] Broken down into residential mortgage loans, qualifying revolving credit exposures, purchased receivables and other retail including loans to small businesses.

[45] The default probability for a borrower over a one-year period. It is also known as the expected default frequency. A starting point of the measurement of PD is the definition of default. In general, the default event arises from the non-payment of principal or interest. It is commonly admitted that default occurs if payment is past due 90 days. These types of loans are characterised as 'non-performing'.

given default[46] *(LGD), the exposure at default*[47] *(EAD) and the remaining maturity of the exposure*[48] *(m) of the credit portfolio to which the exposure belongs.* The expected loss is a simple multiplication of (PD*LGD*EAD). In conjunction with the maturity estimate of the exposure (*m*) and the diversification coefficient (*rho*), these risk parameters are used to determine capital for both economic capital and Basel II regulatory capital models. Risk weights and thus capital requirements would be determined by a combination of a bank providing the quantitative inputs and the supervisor providing the formulas (the risk weight functions). As designed by the BCBS, the treatment of retail portfolio is more favourable than that of large corporate borrowers[49]. There are two IRB approaches: the foundation and the advanced. The difference between the two is that the former would require the bank only to determine each loan's probability of default and the supervisor would provide the other risk inputs; under the latter, the bank would determine all the risk parameters internally, based on estimations and procedures validated by the supervisor. In principle, both the foundation and the advanced IRB approaches are available for all asset classes, with the exception of the retail class where the advanced IRB is available. The choice of operating under either of the two approaches would in theory require meeting minimum qualifying criteria based on the comprehensiveness and integrity of the banks' internal capabilities for assessing the risk inputs relevant for each approach. It is important to note that the use of internal banking models to assess credit risk exposures, although seemingly powerful tools, in some instances may have suffered from overly optimistic assumptions. In addition, banks have incentives to operate with minimum capital to satisfy the shareholder value creation constraint. Therefore, internal models maybe designed to satisfy such constraint, which make them less reliable to compute the minimum required regulatory capital.

Although Basel II is an improved version of Basel I, many weaknesses persist. These range from the imbalance and weak interaction between its pillars[50] to the flaws in the treatment of several technical aspects which will be later addressed in Basel III. Most importantly, in its first pillar, Basel II relies on a silo approach for assessing and managing three types of risks (credit, market and operational), while using a flawed definition of capital and very low equity levels; does not address excessive leverage and liquidity management at all and heavily relies on external ratings by rating agencies that were largely criticized during the crisis

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[46]   The expected amount of loss on a facility provided to the borrower when s/he defaults. To determine LGD, a bank must be able to identify the borrowers who defaulted, the exposures outstanding at the time of default and the amount and timing of repayments ultimately received. In addition, private information on the borrower and the availability of collateral could serve to develop the LGD estimates.

[47]   The amount the borrower owes at the time of default. The EAD is the sum of the current utilisation expressed as a percentage of the total commitment and the loan equivalent, which is the additional utilisation as a percentage of the unused commitment.

[48]   Which raises the possibility that the original probability of default needs to be revised and possibly increased.

[49]   For a more extensive discussion on the impact of Basel II on SME portfolios, see Ayadi & Resti (2004).

[50]   See Ayadi (2008).

and banks' internal models which in best case scenario use optimistic risk and correlation assumptions to fit into the minimum capital required. The Basel II approach maybe an improvement when compared to Basel I but it was not sufficient to respond to the reality of complex banking institutions that deal with a variety of other risks including the ones that initiated the crisis.

In 2008, during the tipping point of the financial crisis, the most powerful banking lobby, the Institute of International Finance (IIF, 2008) recognised the need to further integrate risk management systems, breaking down silos that may result in missed issues across credit, market and operational risks. Equally, in another report published in March 2008 on risk management practices in the aftermath of the 2007 financial crisis, the Senior Supervisors Group[51] recognised the necessity to be armed with a comprehensive approach to viewing firm-wide exposures and risk. In the same line of thinking, the FSF (2008) underscored the importance of Pillar 2 in strengthening banks' risk assessment and management practices.

The financial crisis has urged international regulators to upgrade their regulatory tools to aspire for a better regulation of the banking sector in the future, in what was called Basel III. However, the main concern, as will be explained in what follows is the loss of momentum after the decision of the Basel Committee to opt for a transition period until 2019 for the implementation of the rules.

To strengthen the capital framework globally, international regulators within the Basel Committee agreed to raise the minimum and quality of capital instrument to ensure that they fully absorb losses and do not expose tax payers' money any longer. The minimum common equity requirement will be increased from 2% to 4.5% progressively until January 2019. In addition, banks will be required to hold a capital conservation buffer of 0.625% in 2016 up to 2.5% in 2019 to withstand future periods of stress. This will bring the total common equity requirements from 3.5% in 2013 to 7% in 2019. As for trading, derivatives, and securitizations activities, a new capital requirement will be introduced at the end of 2011. These capital requirements will be supplemented by a non-risk-based leverage ratio that will serve as a backstop to the risk-based measures. A minimum Tier 1 leverage ratio will be tested during the parallel run period. In addition, a liquidity coverage ratio (LCR) will be introduced on 1 January 2015 and the net stable funding ratio (NSFR) will move to a minimum standard by 1 January 2018.

Notwithstanding the efforts by the Basel Committee to improve the quality of capital (key in the design of the regulatory capital ratio), the consideration of the leverage and liquidity ratios to complement the risk-sensitive minimum capital requirements, the length of the transition period watered down these upgrades.

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[51] From France, Germany, Switzerland, the UK and the US.

This long transition period was the result of the banking industry's efforts to these changes that would certainly lead to some fundamental changes in their business models.

5.5. What are the Unresolved Flaws of Basel Regulations

Amidst the crisis, there has been no discussion to rethink the fundamental flaws in the calculation of the Basel II capital ratio – notably the Risk Weighted Asset (RWA) concept. Indeed, because of the inherent flaws of the Basel II design, the RWA can easily be optimised particularly when major banking risks are not considered and their interaction is not counted in the formulas used and when probabilities of default and loss given default are static measures and do not account for the swings in the cycle. By construction, the risk concept used is a static one and does not move along with the economic cycle and therefore does not give incentives for banks to re-price risk when economic conditions are improving (or deteriorating).

Furthermore, banks are companies where control and ownership are separated in most of the cases and where agency problems are common. Banks' CEOs are required to maximize the value to the shareholders', while being compliant with national regulation. Since they also tend to be engaged in empire building (either through maximizing their executive compensation and/or political leverage), CEOs' may have more incentives to serve the interests of the shareholders by taking more risk for the amount of capital they allocate for regulatory purposes. In other terms, a rational behavior of CEOs of shareholder's value banks is to maximize returns and to minimize equity or both (See Table 2, p. 83).

When giving more flexibility to banks to measure their capital requirements ratio (own funds/RWA) using their internal models and comply with a minimum of 8% set by the regulators, there is a high probability that they opt to minimize the calculation of RWA by getting the recognition to use lax assumptions on their overall exposures and maximize own funds by getting recognition of innovative hybrid capital instruments.

This hypothesis has been confirmed in an empirical study on the European banking sector by Ayadi *et al.* (2011) confirming the need to revisit the use of RWA.

This incentive which is a direct consequence of the design of Basel II results in an acute regulatory arbitrage that may not be avoided albeit the application of Basel III.

Table 2: Tier 1 and Equity/assets of top banks before and during the crisis

	Tier 1 ratio of top banks (%)				Equity/Assets (%)			
	2008	2007	2006	2005	2008	2007	2006	2005
BELGIUM	11.5%	8.8%	9.5%	9.4%	2.9%	4.0%	3.2%	3.1%
ICELAND		9.4%	11.3%	10.2%	1.8%	6.1%	7.3%	7.4%
IRELAND	8.8%	8.1%	8.4%	7.9%	2.2%	3.5%	3.6%	2.9%
NETHERLANDS	9.7%	9.8%	8.9%	9.8%	2.9%	3.8%	3.1%	3.2%
UK	6.8%	7.5%	7.5%	6.9%	1.8%	3.0%	3.3%	3.4%
USA	8.4%	8.2%	8.4%	8.2%	8.0%	8.7%	8.8%	9.1%
CANADA	9.5%	9.6%	10.4%	10.0%	4.2%	4.1%	4.4%	4.4%

5.6.   Basel Regulation, Incentives and Role of Pillars 2 and 3

Most of the theoretical literature describes capital regulations as a system of *ex-ante enforcement* in which compliance is exogenous. Several recent papers have challenged this approach by considering banks that weigh the costs and benefits of complying. Milne (2002) argues that banks' risk-taking behaviour can be curbed by toughening regulatory penalties rather than using more stringent capital requirements. Estrella (2004), on the other hand, considers the role of a number of regulatory tools. The author finds that neither the voluntary disclosure nor the capital requirements can alone be successful in aligning the interests of the banks with those of the regulator. Moreover, heavy sanctions are unlikely to work because they are unlikely to be deemed credible, since the regulator's ability to impose such penalties on potentially failing institutions is likely to be very limited. Lastly, both capital regulations and voluntary disclosure rules need to be supplemented by financial supervision and market discipline in order to achieve ex-post efficiency gains, providing justification for the supervisory review process (Pillar 2) and market discipline (Pillar 3).

Considering the menu of approaches to capital requirements under Basel II, Repullo and Suarez (2004) analyze the implications of the reform on loan pricing. The authors find that the low risk banks will tend to favour the internal ratings based (IRB) approach, which allows banks to compute their own charges using their risk models. In turn, higher risk banks will favour standardized approach, which refines the Basel I rules by applying the external ratings, whenever possible. The introduction of the IRB approach allows banks to separate themselves according to their risk preferences and provide loan pricing benefits to low risk firms. The authors highlight, however, that their results rest crucially on their ability and willingness to truthfully report the underlying risks, which highlights the importance of the supervisory review process (Pillar 2) of Basel II.

In view of these results, banking regulation must be viewed as an integrated risk governance, management and assessment framework. In this respect, Pillar 2

must play the leading role in prompting banks to govern risk on an integrated basis and at all organisational levels with a systematic oversight by the senior management and the board and to constantly develop, refine and make better use of risk-measurement and management techniques. Pillar 1 should be viewed as complementing Pillar 2 to achieve effective supervision. Several indicators should be looked at under Pillar 1, including the Basel II risk sensitive ratio, a liquidity cushion and a leverage ratio.

The policy move in Europe to enable supervisory authorities to impose capital sanctions on financial institutions when remuneration policies are not in line with effective risk management is one step in the right direction. Not only should a well designed remuneration package discourage excessive risk taking and be in line with long term objective of the firm, but also payment of bonuses should be deferred or clawed back. Capital sanctions must be undertaken on the basis of clear, harmonised and enforceable criteria.

In Europe, full implementation of Pillar 2 at a bank level will ensure an effective capital adequacy, leverage and liquidity assessment and may avoid capital add-on requirements and possible sanctions that can be arbitrary and risk insensitive. Such threat is an additional incentive for banks to establish a coherent risk governance, assessment and measurement framework that takes into account the 'real' risk profile of the institution.

Supervisors must run stress tests regularly and make the results available to the market. Relevant elements of the supervisory review process must be disclosed to the market to discipline banks. Towards this end, international regulators should rethink – in view of strengthening – the contents and role of and the interaction between the 3 Pillars (See Figure 2). Today the interaction between Pillar 2 and 3 is non existent and largely ineffective. In this vein, it is essential to establish an integrated regulatory approach to risk governance in line with internal modern risk management and measurement techniques that foster better overall institution-wide risk pricing and transparency, a clearly defined interaction between the financial institution and its supervisors (including a system of rewards and sanctions), and a proper and effective disclosure for market discipline purposes (such as credible and annual stress tests.

The interaction between the financial institution and its supervisors must be built on clearly defined principles based on a sound corporate governance system in which risk measurement and management are key and in which implementation can be easily monitored. To achieve this objective, supervisors should be armed with adequate capabilities and sufficient resources and tools to cope with the challenge. Needless to say that for Pillar 2 to work effectively, a full convergence of supervisory practices is essential. Moreover, solutions contemplating increasing the resources of regulators will have to be prioritized. Today, supervisory

authorities face an important challenge to efficiently monitor complex activities of banking institutions. First, they are expected to build a substantial body of quantitative and qualitative expertise and to work closely with banks (with a particular focus on systemic banks). In practice, this will translate into the efficient use of larger human and technical resources in place. Second, they have to apply a clear and consistent approach on prudential measures resulting in capital add-ons. Third, they have to establish a mechanism for timely cooperation and exchange of information in both favourable and adverse market conditions.

Finally under Pillar 3, market discipline has to be viewed as an important mechanism to induce banks to assess and manage effectively their risks and to maintain sufficient levels of capital accordingly. Effective market discipline requires not only that relevant information is available to investors but also that it is possible to use this information to discipline institutions. Disclosing specific aspects of the supervisory review process, such as stress tests results, capital add-ons, counter-cyclical requirements may be considered to achieve this purpose.
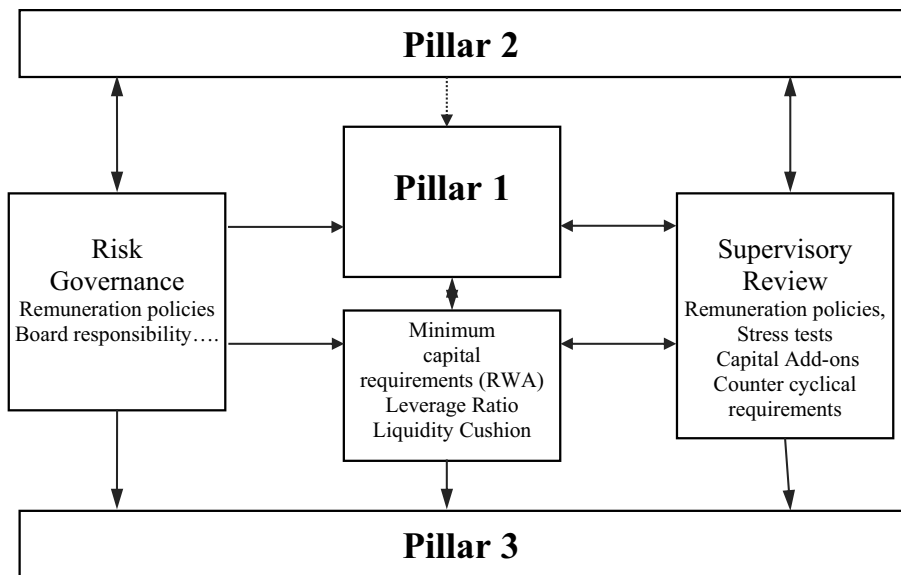
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6.   PERFECT MODELS, FALLIBLE HUMANS?

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Mathematical models of financial phenomena, either for valuation or for risk modeling purposes, have certainly received some criticism after the recent financial crisis. The presumed omnipotence of mathematical models and the cost and effort needed to arrive at the results, often made that the qualitative analysis and professional judgement were neglected. Model results sometimes reigned unchallenged. Fortunately, this is no longer the case. To cite just one source, the de Larosière report[1] stated in 2009 that "Future rules will have to be better complemented by more reliance on judgement, instead of being exclusively based on internal risk models". The purpose of this paper is not to contribute to the theoretical discussions as to the applicability of models to get a grip on specific financial processes. Many papers and books have already been written on that subject. The aim is rather to give a testimonial of the common practices of model development and usage, in both the banking and insurance industry, based on the author's experience as advisor to the industry. As such, it is to be classified as 'anecdotal evidence'. After commenting on the current reality of the practical use of models, we briefly touch upon the inherent limitations of human beings in dealing with probabilistic phenomena.

It is currently common to prudential regulation in both banking and insurance, that financial institutions have the option to use so-called internal models to determine their regulatory capital requirements. In exchange for this freedom, the regulation of course imposes several criteria that should together provide comfort on the results of those internal models. One can think in this context of data quality requirements, a system of governance by which institutions decide to use a model, the use test (to show that the models used actually serve to make business decisions), and a formal approval process by the institution's supervisor.

One other requirement is that these internal models are subjected to a validation process by a team of persons that are independent from the model developers. While this regulatory requirement originated in the models used for regulatory capital requirements, which both under Basel II(I) and Solvency II would be called Pillar I models, the regulatory scope of model validation is expanding. For example, the recent BIS/IOSCO paper on Financial Market Infrastructures [FMI] also imposes model validation, and regulators regularly ask for validation procedures on economic capital (Pillar II, ICAAP or ORSA) models as well. Given the

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[1]   *The High-Level Group on Financial Supervision in the EU*, Chaired by Jacques de Larosière, Report, Brussels, 25 February 2009.

challenge and cost of maintaining in an institution two equally skilled teams of modeling experts that can act in full independence of each other, the scope of the model validation teams is in practice still often limited to these Pillar I internal models. However, most practitioners would agree that in principle, these validation processes would deserve to be applied to all other types of models that are being used in financial institutions, such as pricing models of client products, valuation models of complex financial instruments, algorithmic trading models among others.

6.1.   Perfecting Models through Model Validation

Recently published Solvency II Level 2 regulation, CEIOPS (2009), defines 8 areas of model development and use that should be covered by the model validation process. These are: data, model documentation, methods used, the IT systems on which the model is implemented, the assumptions in the model, the model governance, the role of expert judgement and the use test. We now zoom in and comment on each of these domains, providing our personal interpretation of what exactly falls in each of these categories as we go along.

6.1.1.   The Use of Data in Models

By data, we roughly mean all data that directly or indirectly feed the model. This can be the contractual information on a portfolio of mortgages or insurance policies, the contractual properties of financial instruments in a trading book, business volume data feeding an operational risk model, data on the behavior of clients (for instance prepayment on mortgages or the reactivity of deposits with respect to changes in interest rates), historical time series of market prices from which volatilities and correlations are determined, external loss data for operational risk etc. The last few are examples of data that is in itself input for analyses to determine assumptions of the model, *e.g.* on how deposit stability is incorporated, what yield curve to use, etc.

The objective is of course that the data that feed the model should be current, accurate and complete. Any translation of legal contracts into standardized characteristics that are amenable to mathematical modeling, will involve some level of simplification. One area of specific risk in this respect are all sorts of explicit or implicit options that for instance retail customers may have (*e.g.* guaranteed returns and profit sharing in investment like insurance products, prepayment in mortgages, etc.). Another aspect is that, even with current computer processing power, exposure data may need to be aggregated or simplified in order to keep the throughput time of the calculation acceptable. Choices made in this domain, are particularly time consuming to assess in a validation process, *e.g.* through the

review of a sample of contracts. Sometimes it may even be impossible to objectively challenge the approach due to prohibitive costs related to getting other data or differently aggregated data from the source systems.

Data may be missing in the source systems, or may clearly be erroneous, such that before starting the model calculations, data is cleaned and enriched. Even if according to best practices, the changes/improvements to the data are made reversible by keeping a full audit trail, there is an important risk that the common sense correction rules in fact introduce a bias in the results of the model. For example, in Stahl *et al.* (2007), it is demonstrated that in a credit scoring model for low default portfolios, different common sense rules to complete missing data, could lead to credit ratings that differed not just one but several notches.

From an operational and process point of view, the following issues are frequently observed in the context of data. It is important to have a single version of the truth of the data within the organisation. In particular with the growing need for data by the risk departments, unclear ownership of the data (*e.g.* the risk or the finance department) leads to duplicate data sets and reconciliation problems downstream in the reporting flows. Secondly, multiple legacy systems lead not only to an explosion of the IT costs for unlocking the data, but they also often present organisations with inconsistent definitions for the same data element in the different systems. The way to handle these problems is by formalising data definitions and structures in a data model embedded in a robust data governance structure. This is a non-trivial undertaking, that currently many insurance companies are going through, under the impetus of Solvency II.

6.1.2.   Model Documentation

Model documentation should contribute to the mitigation of at least two risks that the use of models entails. The first is the key-person risk, both at the level of the development of the model and its daily operation. This means that the documentation should be such that if the model developers are not available, a knowledgeable third party should be able to run the model, or, if need be, rebuild it on a different technological platform using the documentation. The second is the risk that business users and management use the model for an unintended purpose due to insufficient understanding of the strengths and the weaknesses of the model. This implies that there are at least three levels of documentation required which are, in no particular order: 1) a detailed documentation of the mathematical aspects of the model, including numerical procedures, 2) a qualitative description of the model and its underlying assumptions, including an overview of the limitations (of use) of the model, and 3) an operational procedure setting out how to run the model on which data on a step by step basis.

It goes without saying that maintaining a high quality set of model documentation along the above lines, for an ever expanding scope of models, represents a significant administrative burden, also on the human resources side. Overall, there is a trend towards improving quality of the documentation in the financial services industry over the past years, although very few standards or market best practices are available. Since regulation mostly expects companies to have an as good understanding of vendor models as of entirely in-house developed models, vendors are improving documentation as enabler for selling their product, despite legitimate concerns over intellectual property.

6.1.3. Methodology

This pertains to the mathematical procedures and approaches at the heart of the model. Overall, standard theoretical concepts are often taken for granted, even though their widespread use may be more driven by mathematical tractability (*e.g.* normal distributions), than by their power to describe real world phenomena. A recent example is the almost universal use of correlations in portfolio credit models, even though this parameter is not really observable. Model validation is probably contributing to, if not reinforcing, this herding behavior in modeling, since the references to academic literature, evidence of peer group practices and the relevant regulatory requirements are the three most obvious reference points for the model validator when accepting a model's mathematical approach. A further contribution to this model herding comes from vendor models, that are a de facto incorporation of market practice. For example, most vendor economic scenario generators (ESG) for life insurance modeling have over the last few year progressed from one factor models, to two-factor models, leading to peer group pressure, sometimes enhanced by regulators, on all insurance undertakings with an in-house ESG to also go down this road.

For the individual modeler and model validator, in particular when working in the domain of capital models, the range of mathematical theories and capital market practices that needs to be mastered, is enormous. She needs to know all the implications for the discounting in the models of the recent developments in the money markets with the appearance of basis spreads, up to the characteristics of different copulas and how to choose the one that is best suited for the application at hand and to calibrate it in a relevant way. The modeler must have a good understanding of the different products being offered by the company to its clients, and must have a firm grasp of how implicit options and client behaviour can impact the company's exposure. And given that a lot of the modeling is based on numerical simulations, good knowledge of numerical and coding procedures is necessary. Finally, to really make an impact, the modeler should not just be an extremely good technician, but also a gifted communicator who can help man-

agement understand the strengths and limitations of the models in layman terms, to ensure that the models are used for the purpose they were designed for.

When one has such extremely talented modelers the designing and implementing of sophisticated mathematical models risks becoming a goal in itself. Resources are sometimes spent on refining the model, increasing its precision (roughly speaking, the number of meaningful digits in the outcome) while losing sight of some structural simplifications and assumptions made in the early stages of the model design that make the model biased and inaccurate (think of a bent needle in an speedometer, the precision stays, but the result is no longer accurate). Having a constructive and open dialogue between the business users, who master the underlying phenomena being modeled, and the technical experts putting all this into model structures, should provide some mitigation to this risk. After all, as the financial crisis has shown, during many crucial weekends, there was only time for order of magnitude estimates of values and expected losses, and many dramatic decisions were out of necessity based on such simple analyses.

Combining the difficulties of the modeling itself, with the challenge of getting the right data for the models, often within the context of short reporting cycles, makes that sometimes time is lacking to reflect on the weaknesses of the models and their limitations, and to ask the basic question on whether intuitively and based on knowledge of the exposures, the result can be grasped qualitatively. Moreover, there is of course always the risk that after working for months on a particular model, the developer loses the capacity to objectively assess the end result.

A small remark concerning numerical procedures is also in order. Most of the models rely on statistical procedures, either to compute averages of distributions like in risk neutral derivative pricing, or to estimate percentiles of distributions for example from histograms. All such calculations are subject to numerical estimation errors, that are function of the complexity of the phenomenon being modeled. It would be best scientific practice to always determine the estimation error, and to incorporate it in the decision process based on the model's outcome. Only a minority of financial institutions are doing this in a systematic way.

All these are obviously arguments reinforcing the need for appropriate model validation procedures, even if not required from a regulatory perspective.

6.1.4. Systems & IT

Even if from a mathematical and academic perspective the model is appropriate and correct, things can still go wrong upon its implementation in IT tools and systems. The source of error can be multiple. For instance, the designer of the model is not necessarily the same as the person who actually programs it, and a

misinterpretation of the model as defined in the business specifications takes place. Libraries providing for standard numerical procedures such as optimization or random number generation are maybe not well understood black boxes and are used wrongly. Moreover, in the omnipresent world of spreadsheet models, there is little control over the evolution of the model. Even if a first version was found to be correct during a validation process, there is no guarantee that one year later this still is the case. Obviously, given that more robust IT implementations are usually more available for more mature and plain vanilla models (of products or risk exposures), this 'spreadsheet risk' is more important for those models where also model risk is more present in the first place due to their complexity or novelty.

From a model validation perspective, the only really satisfactory approach to address the model implementation risk, is to be allowed from a timing and budget perspective, to rebuild the model based on the theoretical documentation, and to compare the results so obtained with the implementation of the model that is being validated. In reality, validators mostly have to settle for a step-by-step walk through of the model in a spreadsheet tool for a few cases, and for a read-through of the code.

Therefore, the trend most recently observed in the insurance industry, where pushed by Solvency II, model development and implementation is being designed along the well-known lines applied to software acceptance and change control, is a more than welcome evolution that can only be encouraged, even though it has a cost.

6.1.5.   Assumptions

Given a mathematically sound model, the value for the assumptions being put in, can still influence the outcome of the model and its relevance for the business decision it needs to support. Sometimes statistical data or other sources allow for an almost objective setting of the assumptions, but sometimes significant amounts of professional judgement are potentially required. Examples of the latter include the parameters determining the stability of non-maturing deposits in banks, mortgage prepayment rates and insurance lapse rates, but also the liquidity premium introduced recently in the valuation of insurance liabilities.

At the very least should the reporting on the models contain a sensitivity analysis indicating how much the output varies in function of the different assumptions. Some assumptions are expected to have a more important impact than others. Policy lapse rates, for example, often have more impact on the cash flow estimated in life insurance models for technical provisions than mortality tables. These sensitivity analyses should allow management to actually perform the task

that is naturally theirs, namely to set formally the assumptions that are used in the calculations. After all, these assumptions may impact product pricing, capital requirements, hedging strategies etc. which all clearly are management responsibilities.

6.1.6.   Model Governance

Historically, the development of mathematical models was often the realm of technical experts, developing models and tools on desktop applications, subject to very little formalised controls both during the model development and the model execution phases. With the more widespread adoption and use of models in the decision processes throughout the organisation, many models are moving away from the desktop (end user computing) into the domain of the regular IT applications. Also the governance structures around their design and use are being upgraded. Choosing which model to use as organisation, is not unlike making a choice of accounting rules that will be applied. Implementing a model in an IT environment, is not dissimilar to putting into production a new transaction processing piece of software. Hence, the governance and processes applied to these two domains are more and more also applied to risk and valuation modeling in financial institutions. In this respect, the tracking of changes and modifications to existing models, both in their mathematical design and their IT implementation, and the reason to do so, receives ever more attention of the supervisors.

In fact, by demonstrating that the model development process is a conscious collaboration between different stakeholders in the organisation, that the choices made are not the point of view of any single individual but of the entire company, that the applications are rigorously tested before being put in production, and that ultimately senior management takes ownership of the models, one lends credibility to the outcome of the models. This should also strengthen the position of the institution when discussing with third parties, such as rating agencies and regulators, that may have their own, differing views of the exposures and models needed to describe those.

6.1.7.   Expert Judgement

In particular in the domain of risk and capital models, aiming to peek into the domain of the improbable events, happening once every 200 years or even once every several 1000 years, lack of objective data implies that expert judgement plays an important role. This can range from the ultimate loss that can come from an insured catastrophe, to the probability that a major financial crisis in the capital markets like in October 2008, coincides with important operational errors in

the organisation. Even when made in good faith, this importance of expert judgement can potentially bias the outcome of the models.

As a first safeguard, it is therefore good practice to at least identify and list explicitly all the areas in the models that rely on expert judgement, in order to avoid that less transparent mathematical procedures obscure the fact that deep down it is really merely an expert's opinion that determines the outcome of the model. Once it is known where expert judgement plays, it is easier to start addressing some of the risks of expert judgement, such as stale judgements that have not been challenged nor updated for years, the dominant person effect where the most senior person in the room de facto determines the group opinion by speaking first, and the general short-sightedness of the human mind that we briefly touch upon below.

6.1.8.   Use Test

Both in Basel II and Solvency II, the so-called 'use test' is a crucial ingredient for having the internal models accepted for calculating and reporting regulatory capital requirements. There are at least two reasons for this. First of all, if management itself does not have enough confidence in its own models to base business decisions on them, such as underwriting a certain risk at a given price, or granting a credit against a certain interest rate, how would one expect the regulator to rely on those models? Secondly, it is expected that if models are used in practice, that their weaknesses will show up more readily by confronting them with reality, leading to a natural pressure from the users to enhance the models.

Demonstrating this use test is gaining traction, but many institutions, in particular in the insurance industry where internal models are much richer and broader than in banking, are still defining the way forward in this respect.

6.2.   Human Beings are Inherently Fallible...

Even if all due care was taken to address the modeling risks reviewed above, it remains that any mathematical model is designed and operated by human beings, within the context of a commercial enterprise that has cost consciousness and revenue generation as justified objectives.

Over the last decades, under the name of 'behavioural finance' an enormous body of academic research was produced, demonstrating how inherent psychological characteristics of human beings make the fundamental tenet of finance theory, namely that economic actors only take rational decisions based on a full knowledge of the facts, may not be a faithful representation of reality in a model. One particular area, termed cognitive biases, investigates how information that

human beings receive, influences their thought processes and decision making. We cite just three examples that are of particular relevance in the context of assessing model risk and model validation. First there is the confirmation bias, the tendency to look for information that confirms your preconceptions or to interpret new data first as a confirmation rather than as contradiction of your prior ideas. The second example, the mental anchoring phenomenon, states that in decisions involving numbers, there is a tendency to take arbitrary reference points or values, even though they may not be relevant for the actual decision. Probably the most familiar example of this is the fact that in deciding on whether or not to sell an investment, we often compare to the (historical) purchase price, even though the really relevant question whether a security is fairly priced or not, does not depend on the price we paid for it, possibly years ago, but only on the expected future cash flows. A third one is the clustering illusion, for which Taleb (2007) uses the more pictorial term 'narrative fallacy', which is the human tendency to detect patterns in a priori purely randomly generated series of data or events (and in the worst of all cases, to then extrapolate this phantom pattern to attempt to predict the future). Clearly, a risk manager should be alerted to the possible effects of these cognitive biases on her and the company's decisions.

Next to these biological limitations of human beings when it comes to modeling risk, the overall risk culture of the organisation, the general mathematical literacy of the decision makers and the prevailing attitude towards the use of mathematical models to try to come to grips with the risks the company is facing, are important potential enablers or disablers for making the organisation use mathematical models intelligently. Having worked for a variety of financial institutions in both banking and insurance, it seems that different attitudes with respect to the role of mathematical models in decision making, can be observed in these two sub-industries of the financial services universe.

6.3.   But do not Discard the Value of Risk Modeling Altogether

The above brief overview of the weaknesses in currently common modeling practices, in combination with the inherent limitations of the human mind, should not of course be read as a justification to ignore the mathematical models entirely as a tool supporting risk analysis and risk management decisions, and to revert back to qualitative and judgmental processes only. Good risk modeling should in a first step contribute to an improved qualitative understanding of the risk exposures, including non-linearity and feedback mechanisms, and of how the different exposures and risk drivers interact. Only with a good understanding of the financial and economical properties of the problem at hand, can one start their translation in mathematical structures. To paraphrase Donald Rumsfeld, one first needs to

transform the unknown unknowns into known unknowns before one can make a probabilistic model for the latter.

Whatever the limitations of the mathematical models of financial reality, most practitioners will agree that the process of model construction enforces a minimum degree of logical consistency in our thinking about risk.

These two points, namely the goal of improving our understanding of the processes at work, and ensuring that our models are at least logically coherent even when based on expert judgement, are two objectives of a recent attempt to open new avenues for risk modeling, while using generally accepted mathematical recipes. In Rebonato (2010), the author shows how one can incorporate both one's view on how different risk factors influence each other (causal relation) and the fact that one may have to rely on expert judgement to set the parameters in the model in the absence of relevant and sufficient frequentist data, in a mathematically consistent framework to estimate for example capital requirements. However, re-introducing qualitative aspects and arguments in risk modelling does not necessarily imply a reduction in the cost of making the model, both in data and in human terms.

Many risk managers realized and were ready to admit in 2008 that we collectively had spent more time running models than thinking about what was really going on. So it is time to do some more thinking again...

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7. THE COOPERATIVE BANKING MODEL: PERFORMANCE AND OPPORTUNITIES

Hans Groeneveld[1]

Abstract

By comparison with European Shareholder Value banks, European cooperative banking groups (ECBGs) appear to have been dealt only a glancing blow by the immediate effects of the credit crisis. Financial indicators show that they escaped relatively unscathed from the crisis and did not need large-scale government support. In this article, we look for possible explanations for their relatively good performance and achievements in recent years. To this end, the unique differentiators and the resulting visible market manifestations of financial cooperatives are explored. Special attention is devoted to their corporate governance with member ownership and influence. Subsequently, theoretical, practical and empirical insights are combined to investigate how ECBGs are positioned for the coming years. This question is discussed against the background of imminent changes in the rules of the game, the business principles and business models in the global financial system. A new dataset for leading ECBGs is used to underpin the descriptive and qualitative considerations. An important conclusion is that ECBGs contribute to diversity in banking, and, consequently, to the stability of national financial systems.

JEL-codes: G21, G30, L25, P13

Keywords: European cooperative banks, corporate governance, performance, stability, diversity

7.1. Introduction

The financial perils for countries and banks are not over yet. The situation is far from stable and public confidence in financial institutions is still weak. However, several studies point to the fact that individual European cooperative banking groups (henceforth ECBGs) have weathered previous and current periods of financial distress relatively well (EACB, 2010). ECBGs also came through the crisis of 2007-08 in a quite good shape compared to some large Shareholder Value (henceforth SHV) or listed banks[2]. All European cooperative banks together are responsible for 8 percent of all direct losses and write downs of the entire European banking sector as a result of the credit crisis (Groeneveld, 2011).

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[1] The views in this paper are personal and do not necessarily reflect those of Rabobank Nederland.
[2] For the purpose of the discussion, SHV banks may be regarded as those whose business focus is maximizing shareholder interests and the rate of return on equity capital. SHV banks, of which cooperative banks form the largest part, have a broader focus and in particular maximizing consumer surplus for their owner-members (see Ayadi *et al.*, 2010).

Without any doubt, this is a large amount in euro, but compared to their average market shares of around 20 percent, this is a relatively small percentage and still bearable. Consequently, ECBGs did not need large scale government support and kept relatively good access to the public money and capital markets in the middle of the crisis.

For several reasons, the characteristics and recent performance of ECBGs have remained notably underexposed in recent publications, the press and various reports. Kalmi (2007) ascribes this to the prevalence of the Anglo-Saxon banking model aimed at profit and shareholder value maximization in the last decades. Cooperative institutions were not considered the most efficient, vibrant, or innovative institutions for a long time (Kodres and Narain, 2010). Another reason for the limited attention for financial cooperatives is the lack of empirical data or somewhat longer and consistent time series for key financial indicators, which hampers an objective evaluation of their specific business model. Furthermore, their organizational structures and multiple goals are generally more difficult to understand for 'outsiders' than the corporate governance of SHV banks with their more easily interpretable and single goal of profit maximizing. The European cooperative banking sector can be characterised as 'commonality with diversity' in that there are a set of basic principles that are common to all cooperative banks while at the same time differences exist in some other areas. They are, however, unifying governance features. Anyway, the – run-up to the – subprime crisis triggered an increasing academic and policy interest in the cooperative banking model in recent years (Ayadi *et al.*, 2010; The Economist 2010; Čihák and Hesse, 2007; Oliver Wyman, 2008).

This article contains three important novelties and complements previous studies on cooperative banks in various ways. Firstly, it offers an integral picture of many interlinked issues of cooperative banks by combining theoretical, practical and empirical insights in a concise way. Most existing studies or reports are only of a descriptive or qualitative nature and deal with partial aspects of cooperative banks, without providing consistent 'empirical evidence'. Secondly, it links important contemporary trends in the banking industry to the position and role of ECBGs in the future financial system. Thirdly, a newly constructed empirical database of leading ECBGs is used to corroborate the descriptive and analytical considerations.

Section 2 sketches major changes and planned reforms in the financial system and their consequences for the business principles and market conditions in banking. In Section 3, the specific internal features and performance of ECBGs are analyzed. It is discussed how they impact on their financial structure and other quantitative indicators. Section 4 looks at the presence value of ECBGs in national

financial systems. Section 5 describes their opportunities and challenges in the coming five years.

7.2. Changing or Changed Characteristics of the Global Financial System?

The financial crisis has led to critical assessments of the rules, business principles and business models in banking. Understandably, top priority has been given to safeguarding the stability of the global financial system. A major effort concerned the restoration of confidence and customer focus in the financial sector. Various actions have been undertaken or are underway to achieve these objectives. Prominent initiatives are the far reaching reforms in regulatory and supervisory regimes in the US and in Europe[3]. The Basel Committee on Banking Supervision (BCBS, 2010a) announced higher capital and liquidity requirements for banks as preventive measures to reduce the likelihood of future crises. The regulatory reform will inevitably result in funding structures moving away from volatile and short-term sources, *i.e.* towards more stable and long-term sources, such as capital and deposits. However, the crisis has also increased investors' awareness of banks' capital endowments. It is thus likely that market participants will end up requesting additional buffers on top of the minimum regulatory requirements. The limited funding resources together with the increased demand are probably resulting in increased competition and funding costs in the medium to longer term (ECB, 2010b). This will lead to higher credit interest rates and could lower the potential economic growth rate.

Key is that regulation and supervision should be reformed to encourage a financial system that better mitigates systemic risks (Kodres and Narain, 2010). Important elements in many proposals are strengthening transparency and accountability, enhancing sound regulation, promoting integrity in financial markets and reinforcing international cooperation among regulators and supervisors. Even without regulatory reform and pressure from the BCBS (2010b), many institutions should rethink their risk taking activities and how they can better align risk taking with employee compensation.

Tighter regulation and supervision are necessary to restore confidence and maintain financial stability, but are not sufficient to prevent a next crisis. The same holds for the possible introduction of financial transaction taxes, banking taxes or resolution funds. All these measures cannot prevent a systemic crisis. These suggestions can be understood from the perspective of policymakers and taxpayers, who had to pay for rescuing troubled banks in the end. However, banking

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[3]   For example, Financial Stability Forum (2008), G-20 (2009a/b), The de Larosière Group (2009).

taxes and resolution funds do not contain incentives for banks to behave more prudently or less risky in the future. Actually, a fund could aggravate the problem of moral hazard on behalf of banks. Knowing that a well filled fund is available as a safety net in case of problems could even provoke riskier behavior by certain financial institutions. A better way to discourage excessive risk taking by financial institutions is that banks' shareholders and bond holders are exposed to financial risks if a bank gets into difficulties. This will induce shareholders and bond holders to monitor and steer the risk profile of a financial institution more carefully. The suggested incentives could be introduced via so-called risk-sharing instruments, like contingent convertibles. Contingent capital is debt that converts into equity or is written off when a bank is experiencing huge losses and/or write downs which leads to an evaporation of capital, or when certain triggers for the minimum required capital buffers are hit.

Table 1: Main effects of the financial crisis for the entire banking industry

Main effects	Characteristics of the new financial system
1. Different rules of the game	• Corporate governance, clear attention to risk management • Compensation schemes to introduce the right incentives • Tighter supervision and regulation for banks and other financial institutions on an international level. • Higher liquidity and solvency requirements for banks • Lasting political and policy influence: issues of gradual run down of government intervention, exit strategies, reversal of extraordinary monetary actions, proposals for financial transaction taxes, banking taxes and resolution funds.
2. Different business principles	• Customer focus • Morality and integrity • Healthy risk attitude • Long-term perspectives instead of short-term profits • Attention to all stakeholders, not just shareholders • Attention to externalities of behavior • Transparency in products and organization
3. Different business models	• Less, but simpler and transparent products and activities • Focus on retail banking • Reorientation towards home markets due to national support • Less scope for large-scale international aspirations, partly due to support from national governments • Dismantling of some large financial conglomerates

A change in the business principles of the financial system will contribute mostly to the restoration and maintenance of financial stability and prudent behavior by financial institutions. These behavioral changes cannot be enforced easily. While the financial sector has traditionally thrived on trust, a general distrust of the banking sector has now emerged. Financial markets and consumers must regain and keep confidence in banks. And banks must have confidence in each other. There have been accusations of corporate greed due to the sustained and often record profits that bank shareholders and management earned until the financial crisis broke out. This led to a public condemnation of the focus on short-term gains and materialism by banks. In this light, governments and society have right-

fully demanded behavioral changes from financial institutions: a greater focus on morality and integrity, a healthy risk attitude, a longer-term perspective, improved (product) transparency and, last but not least, a much stronger customer focus.

According to Michie (2010), the financial sector has taken fairly halfhearted attempts to improve its ethics, risk perception and risk attitudes by its own after the crisis. By late 2008, tough proposals were put forward for healthier and more modest executive and employee compensation structures in the financial services industry (Financial Stability Board, 2009)[4]. Michie finds it disappointing that the larger part of the financial services sector has apparently returned to the 'business as usual' model that has proved so costly to the economy and to public finances. Around the beginning of 2011, a return to the bonus culture was discernible in the United States and the United Kingdom in particular, which was largely fuelled by profits boosted by the increased market power of banks which have been rescued by the taxpayer. Perhaps, the future disclosure requirements on remuneration of the BCBS will bring about the necessary changes (BCBS, 2010b)[5].

Directly following the crisis, a relatively large number of universal and specialized banks also expressed their intention to give the interest of customers again a more prominent place in their daily business (Eurofound, 2010). After the massive bailouts, society is understandably expecting financial institutions to adjust their behavior to reflect the wider public interest and not, necessarily, shareholder interests only. More attention must be paid to the externalities of financial institutions' behavior and priority should be given to collective and sustainable interests[6]. As part of their damaged reputation, the scope of complaints regarding banks has widened considerably. Every aspect in banking is heavily scrutinized and easily criticized by customers. For instance, customers are increasingly complaining about perceived low deposit interest rates and high credit interest rates.

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[4] These schemes induced risky behavior and led to a fixation on short-term profit maximization and consequently acted as a catalyst for the emergence of the crisis. Periodically, the FSB is performing reviews of the steps taken or planned by its member jurisdictions to implement these principles. Notwithstanding different starting points in terms of pre-existing national frameworks addressing compensation issues and the degree of misalignment with prudent risk-taking, the FSB concludes that, on the whole, material progress and a movement towards convergence across jurisdictions have taken place (FSB, 2010).

[5] The objective of these additional requirements on remuneration is to enhance effective market discipline and to allow market participants to assess the quality of the compensation practices. These requirements should also contribute to promote a greater convergence and consistency of disclosure on remuneration. As a result, banks will be requested to disclose qualitative and quantitative information about their remuneration practices and policies covering the following areas: the governance/committee structures; the design/operation of remuneration structure, frequency of review; the independence of compensation from short term results (cash/equity, fixed/variable).

[6] To stimulate these behavioral changes in banking, proposals have been put forward in the Netherlands to introduce a banker's oath as a public ceremony (Advisory Commission 'Future of Banks', 2009). It is intended to radiate self-awareness by bankers of their social responsibilities and the acknowledgement of the crucial role banks are playing in society. The author believes that an oath is not a meaningful and recognizable ritual that appeals to new generations, breaches cynicism and contributes to a subservient attitude of bankers. It cannot ensure any intrinsic commitment on behalf of bankers.

Interim assessments reveal that the promises above are as yet not completely redeemed (Financial Stability Board, 2010).

Due to the envisaged new business principles and tighter regulation and supervision, many banks have reconsidered the nature, size, geographical distribution and goals of their activities. The diversified banking model has shown to have acted as a shock absorber in times of stress, and market participants expect it to increase in importance at the cost of specialized banking models (ECB, 2010b). It is a fact that banks have become more dependent on interest income instead of fee and commission revenues. At the same time, owing to the recent drop in and future pressure on profitability, banks are likely to search for additional profits and economies of scale in selected areas by focusing on their core – domestic – markets, activities and clients. Consolidation in the banking sector and a more efficient use of resources, for instance as measured by bank assets per employee, has continued after the crisis. The financial turmoil has also led to a – temporary – retrenchment of financial markets within national borders and consequently to a reversal of the European financial integration process in banking (ECB, 2010a). Domestic banks have slightly increased their market shares in EU Member States at the expense of foreign branches. More than half of the large European banking groups stated that they amended their internationalization strategies as a result of the financial crisis (ECB, 2010b). Large parts of the shadow banking system and some large international financial conglomerates have been dismantled and a move back towards retail banking has taken place[7]. Finally, the public and politicians have developed an aversion to financial institutions that are considered 'too big to fail', 'too big to manage' or 'too big to save', because this has introduced moral hazard problems in the financial system.

7.3. Differentiators of ECBGs

ECBGs have undergone tremendous transformations and developments since their establishment more than a century ago (Oliver Wyman, 2008)[8]. On the face of it, one could conclude that the traditional features and added value of the cooperative banking model have faded away; they gradually looked and start behaving like SHV banks. This assertion rests on a great fallacy, as evidenced by the solid performance of cooperative banks during and after the global credit crisis. It is true that it has been fairly difficult to see that ECBGs differ from their listed competitors in social, economic and financial respects for a long time. Financial products, services, prices and distribution concepts are almost identical

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[7]   This does not mean that it concerns an irreversible development. Retail business is defined as financial products and services distributed through physical and non-physical networks to retail customers and SMEs.
[8]   Many ECBGs have published extensive books on their history in the course of time. See for instance Mooij (2009).

across banks. All banks were also perceived as equally safe and financially sound until the crisis emerged. In fact, ECBGs were sometimes forced into a defensive position prior to the crisis. PA Consulting Group (2003) accused cooperative banks of 'spoiling' the market conditions for other banks. Others (Oliver Wyman, 2008) criticised the sluggishness of decision making processes or exaggerated the principal-agent problem inside ECBGs on merely theoretical considerations (Groeneveld and Llewellyn, 2011)[9].

To rebut these misconceptions, the European Association of Cooperative Banks (EACB, 2005, 2006, 2007) as well as the International Cooperative Banking Association (ICBA) have put a lot of effort in emphasizing the divergent and special nature of cooperative banks in various reports before 2008. They were only partly successful, since these documents have a predominantly qualitative character. A major weakness concerned the lack of 'hard' data on a wide range of issues concerning cooperative banks and the dominance of the shareholder value thinking. All these reports stress that the mission, vision and considerations of cooperative banks have basically remained the same since their creation. For instance, the EACB (2005) states that:

> *"The primary mission of cooperative banks is to promote the economic interest of their members, who are their customers. cooperative banks strive to do so by offering quality products and services at attractive prices from the perspective of what is good for the customer. They have an impact presence on the conditions of products in the whole banking market and support the economic and social integration of individuals".*

This concise formulation embodies the roots of cooperative banking in a new phrasing. Apparently, the customer has always been and is still at the core of their operations and, at a local level, members have a say in the local member bank's policy. Thus, the 'promised' greater focus on the customer by many financial institutions following the crisis should sound quite awkward to cooperative banks. The passage above also suggests that cooperative banks have an 'impact presence' on the banking market. To define and quantify this presence value, however, is a difficult undertaking. Even more so, because they actually hint at a noticeable causal relationship between cooperative banks and society and the structural characteristics of banking markets. Such a causality is hard to demonstrate empirically, as it really only manifests itself on the entry or exit of a large cooperative bank or during financial crises (Groeneveld and Sjauw-Koen-Fa, 2009). But it also works the other way round: society and the market environment influence cooperative banks. Another implicit EACB claim is that coopera-

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[9]   This refers to potential conflicts of interest between managers and owners of a bank. Agency issues arise in any organisation in which there is a separation of decision and risk-taking functions. In the case of cooperative banks, these issues emerge between the management and the members. In the case of shareholder value companies, these issues occur between the management and shareholders.

tive banks apply an external and long term orientation. They assert not be aiming at – short term – benefits of their operations, services and products for members/ customers and themselves, but also want to contribute to economic and social well being in local communities. This alleged longer term perspective and priority to collective and sustainable interests are precisely the behavioural changes which the public, politicians and regulators are demanding from financial institutions following the credit crisis.

What can be stated with certainty is that cooperative banks stand out regarding their history, structure, organisational form and original business objectives from SHV or listed banks. The main observable differentiator of ECBGs is their specific corporate governance with member ownership. Theoretically, this intrinsic feature is *only* a precondition to be able to operate or to position yourself in a specific way in the market. In practice, this differentiator did reveal pronounced external market results of cooperative banks, which were fairly unnoticed or invisible until the crisis hit. Hence, this differentiator has effectively provoked cooperatives to steer a certain 'business' course and to aim at particular social, economic and financial objectives (Ayadi *et al.*, 2010). One of the results is that they exert a positive impact on the stability of national financial systems and have a presence value to date. These specifics are visualized in diagram 1 with the main differentiator 'Corporate governance' in the middle. Of course, the elements interact and are interrelated. In the next subsections, the characteristics and external financial results stemming from this main differentiator are discussed. The impact of the coming changes in the rules of the game, business principles and business models on ECBGs will be analyzed as well.

7.3.1. Member Influence

Cooperative banks are owned by their members who are private citizens. Members have significance not only by virtue of being owners but also because they are an integral part of the governance structure although the precise arrangements vary considerably. In most cases, ownership is at the local and regional level, although there are notable exceptions (*e.g.* Rabobank, Crédit Agricole and Banche Popolari). Voting rights conferred by membership are based on the principle of One-Member-One-Vote (OMOV) and are not proportional to the size of a member's stake in the bank. This also means that members cannot accumulate votes through purchases of shares in a market. The implication is that the ownership rights inherent in OMOV model are necessarily widely dispersed with no individual or group able to build up a controlling position. This does not pose serious problems though. Members are represented in many commissions and consultative bodies. Besides, members elect the supervisory boards of local or regional banks and – indirectly of – the Central Network Institution (CNI) or APEX.

Diagram 1: Internal characteristics and external manifestations stemming from main differentiator

Internal characteristics	External manifestations

- Member influence and ownership: one member one vote
- Customer focus: long term relationships
- Business model with emphasis on retail banking
- Key differentiator: corporate governance
- Cross guarantee scheme
- Attention for many stakeholders: social goals
- Profits as necessary condition

- High customer satisfaction: rising market shares, dense branch networks
- Stable profits, efficient operations, high capitalization, high rating, low funding costs
- Relatively unaffected by credit crisis, no government support
- Contribution to stability and diversity in financial systems

Source: the Author

Another noticeable advantage of member ownership is that it entails a more consensus-driven approach and prevents a strong fixation on just one stakeholder, which is the case in the SHV model. Members have different backgrounds and belong to different social groups or networks. This is accompanied by a longer term and risk-averse view, which translates into a more stable banking approach focused on retail banking compared to SHV banks being more dependent on riskier wholesale and investment banking. With their strong local ties and large networks, cooperative banks are in theory better equipped to assess the creditworthiness and risks of customers at a local level.

7.3.2. Customers' Interests First

The interests of members rather than external shareholders are at the centre of cooperative banks' business strategies. Cooperative banks often have an element of a 'social mission' frequently, though not exclusively, focussed on the local community. Cooperative banks often publicly state that they do not aim to maximise profits but rather to maximise customer value (EACB, 2005). It is true that this assertion is difficult to substantiate with 'hard data' or empirical evidence. Hence, the perception and appreciation of customers of the proclaimed customer centric-

ity of cooperative banks are unknown, which is quite unsatisfactory for both researchers, policy makers and cooperative banks themselves. One could argue that customer satisfaction is ultimately visible in member to population ratios, market shares or financial performance of cooperative banks, but obtaining direct insights and opinions from customers would provide more powerful evidence. It is all about the perception of customers whether cooperative banks 'walk their talk'. Or in other words, keep their promises and treat their customers fairly.

7.3.2.1. *Member Ratios and Market Shares*

Contrary to the limited attention for the cooperative banking model among academics and policy makers in the recent past, this model has been rather successful, as measured by the rise in the member to population ratio (Chart 1) and in domestic market shares (Chart 2). Average market shares as well as member-to-population ratios of ECBGs continued to increase in the financially and economically turbulent years 2008-09. If the number of members would drop considerably, this would eventually erode the legitimacy and an important discriminating feature of cooperative banks. In six EU countries where ECBGs have domestic market shares of more than 25 percent, the member to population ratio increased from 14 percent in 1997 to 19 percent in 2009. These countries include Austria, Finland, France, Germany, Italy and the Netherlands (henceforth EU6). The increase in members was most pronounced in 2009. The underlying reasons for the increasing popularity are hard to isolate and are of a financial and immaterial nature[10]. The ratios indicate that cooperative banks have succeeded in attracting new members with their products, services, cooperative business models or other distinguishing features. It should be noted that most ECBG's have abolished compulsory membership some 20 years ago. Before that, customers had to become members if they wanted to apply for a credit or loan from a cooperative bank (See Chart 1, p. 111).

Regarding market shares, European cooperative banks were able to gradually strengthen their position in the loan and deposit markets over the last decade and in the financially turbulent years 2007 and 2008 (Chart 2). This trend continued in 2009. The rise in market shares has been due to exogenous factors and acquisitions of other financial institutions. The market shares for deposits and loans are significant, but below the market shares for branches. The market shares for branch offices are in EU6 approximately 10 percentage points higher than those for deposits. Over the last decade, cooperative banks have gained branch market

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[10] Some of these reasons could be financial conditions, but also the degree of customer satisfaction, the extent to which banks act in the interest of customers, access to the bank's networks and knowledge, the stability/duration of relationships, the way banks deal with environmental and sustainability issues, the degree of product and price transparency, etc.

Chart 1: Members and member to population ratio of ECBGs in EU6
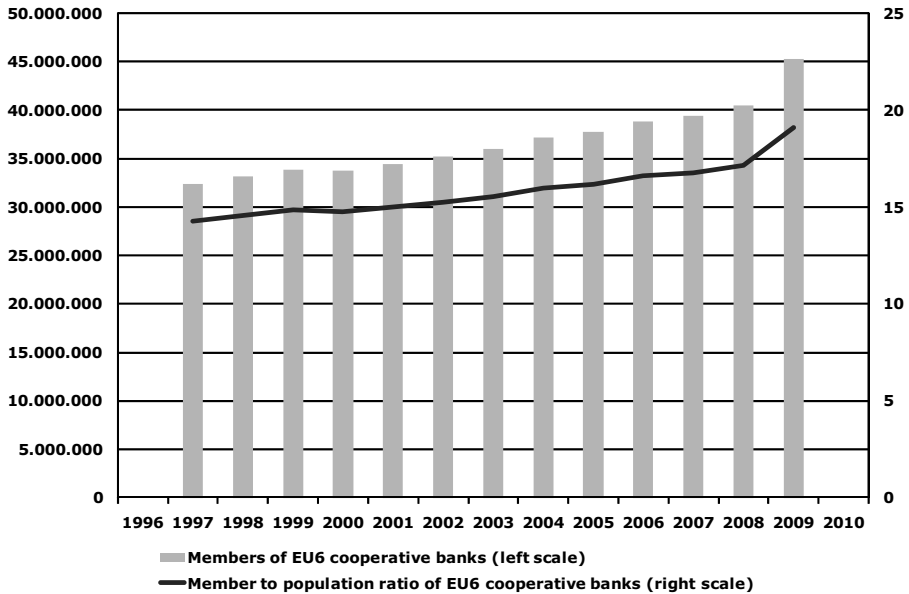
Source: *Annual reports of cooperative banks and national population statistics.*
Note: *Members of all ECBGs in Austria, Finland, France, Germany, Italy and the Netherlands are added.*

share for two reasons. The first is that cooperative banks in France and Italy have expanded their branch office networks either organically or via acquisitions. The second explanation is that cooperative banks in the other EU countries have slimmed down the number of branch offices to a lesser extent than their competitors in the context of cost-cutting or efficiency programmes. As a result, cooperative banks have strengthened their local presence. Against the background of the expected 'return to retail banking' of many financial players in the coming years, cooperative banks can take advantage of this fact. Amidst of the crisis, the possession of a dense branch network has proven its value. Customers viewed cooperative banks as safe havens and transferred substantial volumes of deposits to cooperative banks, leading to the visible increase in deposit market shares. The increase in loan market shares in recent years was partly attributable to the solid capitalisation of cooperative banks. They were better able to continue lending to the private sector in the crisis, whereas quite some SHV banks could not attract funding without some form of government support (See Chart 2, p. 112).

7.3.3.   Stable Business Model and Stable Profits

Member ownership leads to a stable business model, focused on sustainable retail banking with stable and moderate profit levels. This leads to good liquidity and sound asset quality. The structure, knowledge of local customers and risk diver-

Chart 2: Domestic market shares of ECBGs in EU6
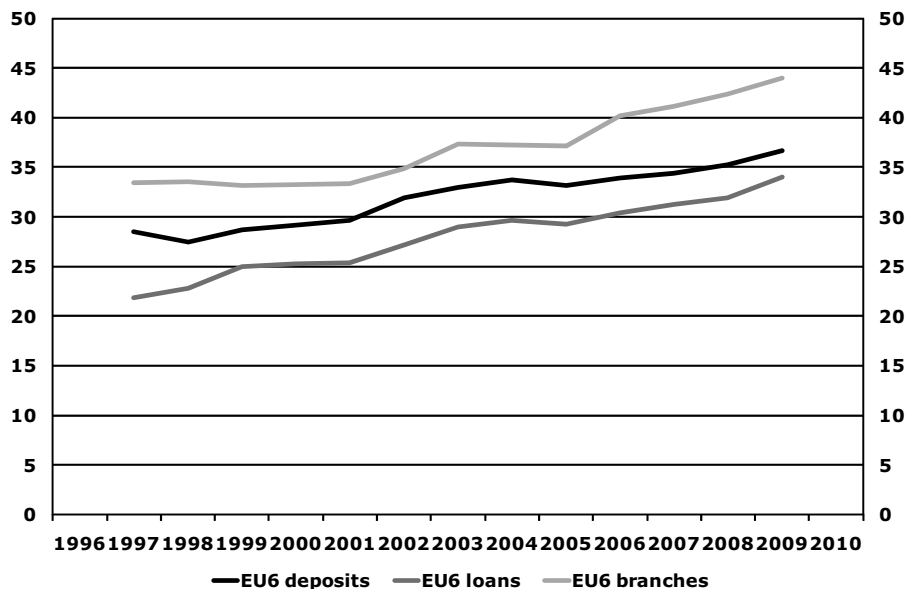
Source: Annual reports of ECBGs and the ECB.
Note: The average domestic market shares of all ECBGs in Austria, Finland, France, Germany, Italy and the Netherlands are plotted.

sification all work in favour of cooperative banks. In contrast to SHV banks, maximising the rate of return on capital is not the exclusive or even dominant business objective of cooperative banks. The essence of the cooperative bank model is that there is no myopic focus on maximising shareholder value. The typical cooperative bank seeks to maximise the benefit of their members (who are also customers) and to maximise consumer surplus. However, as with all banks (irrespective of their capital structure), healthy profitability is an important necessary condition for cooperative banks to safeguard their continuity, to finance growth and credit, and to provide a buffer for inclement times. But, unlike with SHV banks, profit is not a goal in itself but are necessary for continued growth: it is a 'means to an end' rather than the 'end' itself.

The features of their business model are clearly visible in the development of the Return on Equity (ROE; Chart 3). In 'normal' times, cooperative banks actually realize lower but also more stable returns on equity. They are less profit-oriented than commercial banks and manage risks differently. The average ROE of cooperative banks dropped significantly from 10 percent in 2007 to 5 percent in 2008, but this decline was fairly modest compared to the fall in the average ROE of the entire banking sectors from 13 percent in 2007 to *minus* 0.5 percent in 2008 in the countries under review. The crisis has revealed that this most common meas-

ure of a bank's performance is only one part of the story, since a satisfactory level of ROE may reflect either high profitability or more limited equity capital. The high profits of other banks before the crisis were in any case more related to high risks in derivatives markets and other investments (IMF, 2010). Profitability is therefore no reliable indicator for sustainability. In an environment with a high volatility, such as during the global financial crisis, the ROE does not help to provide an understanding of the potential trade-off between risk and return in performance (ECB, 2010c).

Chart 3: Return on Equity of ECBGs and entire banking systems
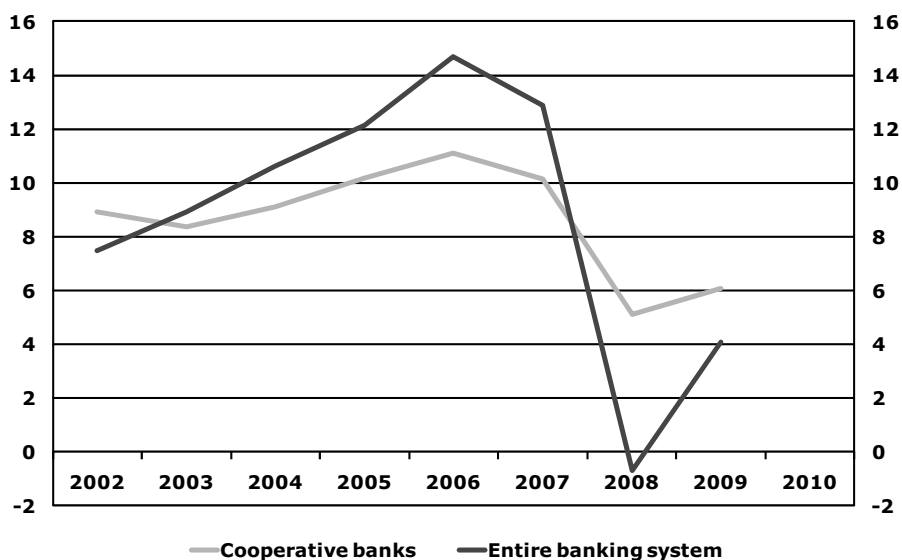
Source: Annual reports and data from national central banks or supervisors.
Note: The chart displays data of ECBGs in Austria, Finland, France, Germany, Italy, the Netherlands, Spain and Switzerland and entire banking systems in these countries.

7.3.4.   High Capitalisation, High Rating and Low Funding Costs

Cooperative banks barely distribute profits but add it to their reserves or the banks' own funds, although members may sometimes be able to vote for a limited distribution of profits[11]. Consequently, cooperative banks are some of the more highly capitalised institutions in Europe as a result of their unique model and ownership structure. Cooperative banks accumulate capital by design, as their original purpose was to overcome a shortage of capital for their chosen activities. The knowledge that this carefully built-up capital cannot be easily replaced by external sources after considerable losses stimulates cooperative bank managers

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[11]   However, some banks do pay limited dividends and have instituted loyalty schemes for members.

to apply a relatively low risk appetite. This disciplining factor partly explained the relatively good performance of financial cooperatives during and after the initial credit crisis.

Since ECBGs managed to come through the crisis without much difficulties, there is no real need for introducing any new regulatory standards and/or additional liquidity or capital requirements from their perspective. As an illustration, Box 1 discusses some adjustments to various initial regulatory and supervisory reforms in order to do justice to the specifics of the cooperative banking model. Chart 4 shows that the tier 1 ratio of cooperative bank groups has always been higher than the tier 1 ratio of entire banking systems, with the exception of 2009 when quite a few SHV banks received capital injections from national governments and were forced by the financial markets to increase their capital buffers and/or to reduce their balance sheet (deleveraging).

Chart 4: Tier 1 ratio of cooperative bank groups and entire banking systems
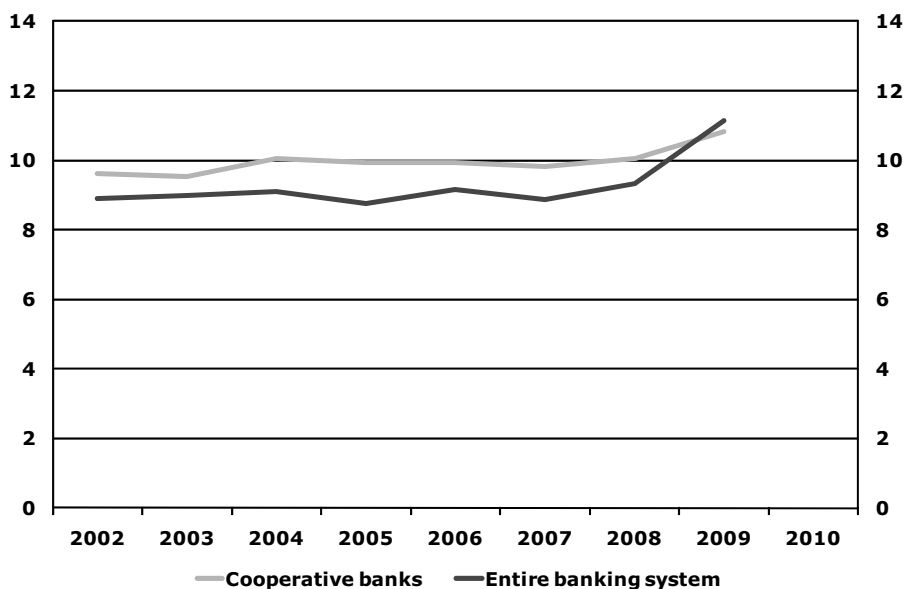
Source: Annual reports and data from national central banks or supervisors.
Note: The chart displays data of all ECBGs in Austria, Finland, France, Germany, Italy, the Netherlands, Spain and Switzerland and entire banking systems in these countries.

Box 1. Adjustments to the Initial Supervisory and Regulatory Proposals for ECBGs

The G20 have committed to developing rules to improve the quality and quantity of banks' capital and to introduce new global liquidity standards as a measure to make financial institutions more resilient to future crises. The Basel Committee on Banking Supervision (BCBS) started to work on this issue in 2009. At the same time, a lot of attention is devoted to the adjustment of compensation schemes to stimulate adherence to a longer term perspective by executives and certain groups of employees. Without taking into account the specifics of the cooperative banking model, the measures proposed at the international level to strengthen the quality of the capital and liquidity base of financial institutions would have put ECBGs in a disadvantageous position. The draft guidelines and rules were adjusted for cooperative banks at a fairly late stage.

Definition of Tier 1 Capital Base

An important element in the discussions concerns the definition of the Tier 1 capital base. The BCBS has indicated that the predominant form of Tier 1 capital is common shares and retained earnings. Regarding these shares, a set of criteria applies whether they can be considered as Core tier 1 capital. However, these criteria pertain to the shares of listed banks. Shares of cooperative banks will never meet these criteria, since the participation of members in the net assets of the cooperative is limited and they usually have no access to the retained earnings added to the capital. This necessitated a special treatment of cooperative shares in the new supervisory framework. In the policy documents, reference is made that shares of cooperative banks can deviate from the criteria as long as they are comparable in major aspects, especially regarding their loss-absorbing capacity.

Liquidity Requirements

The Basel Committee has proposed two liquidity standards: Liquidity Coverage Ratio (LCR) and Net Stable Funding Ratio (NSFR). The purpose of the LCR is to ensure the short-term liquidity of banks. The ratio imposes a minimum amount of high-quality liquid assets to be available in order to balance presumed outgoing cash flows in a stress scenario. For cooperative banks, it is crucial that the existing internal liquidity structures are been taken into account. Initially, stress scenarios in the first consultation paper by the BCBS assumed an unrealistic outflow of deposits from cooperative central institutions. This would create serious problems, especially for non-consolidating ECBGs like in Italy. In the final paper, this inaccuracy has been addressed and two paragraphs are devoted to "Treatment of deposits in institutional networks of cooperative banks". Again, it is indispensable to look at the facts before, during and after the financial crisis. Cooperative banks were definitely not confronted with outflows of deposits. On the contrary, they gained market share in the deposit markets. Hence, Basel III will increase the demand for (long) deposits and will lead to more competition on savings and deposit markets.

Remuneration Policies

In October 2010, CEBS issued a consultation paper on "Guidelines on Remuneration Policies and Practices". Member states and banks are expected to implement these guidelines by 1 January 2011. The background is that the crisis was partly caused by remuneration schemes focusing on short-term economic performance rather than sustainability and long-term business targets. This created risk profiles that were not consistent with reliable and trusted banking practices.

However, excesses of remuneration systems did not occur at cooperative banks at that scale. Cooperative banks operate more in retail banking markets where a bonus culture is less prevalent than in wholesale and investment banking. In the latter markets, bonus systems provided payments immediately after selling the contract or closing a deal without paying little attention to the longer-term risks of the business (Eurofound, 2010). The Guidelines on Remuneration Policies were made suitable for cooperative banks. Initially, the proposal envisaged the obligation to pay a part of the variable remuneration in shares. However, ECBGs and other non-listed banks do not have shares. Consequently, cash pay-out plans for cooperative and non-listed banks were added to the Guidelines.

Leverage Ratio

One of the underlying features of the crisis was that mainly US banks were leveraged with excessive on- and off-balance sheet leverage. Therefore, Basel III introduces a leverage ratio to set a limit on the leverage in the banking system as a non-risk based 'backstop' measure based on gross exposure. The two elements of the ratio are capital (numerator) and gross exposure (denominator) measures. Between 2013 and 2017, a minimum ratio of 3% will be tested. This proposed ratio will have a more severe impact on one bank than on another. ECBGs with a relatively large retail business may be put at a disadvantageous position. The reason is that the ratio is not risk adjusted, whereas retail activities contain relatively little risks. It is unsure yet whether all ECBGs will not be limited in their activities by the leverage ratio. Hence, this remains a point of particular interest for the time being.

Nevertheless, the new tightened capital requirements will represent a challenge for cooperative banks. The reason is that they cannot easily access capital markets to issue new stocks and raise capital like listed banks[12]. Historically, cooperative banks have predominantly relied on retained profits to increase their capital buffers. Apart from the impassable road to issue stocks, the general pressure on banking profitability due to increasing competition on domestic retail markets may pose difficulties for cooperative banks to significantly expand their capital

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[12] This argument can be equally questioned for listed banks, though. The recent financial crisis has demonstrated that these banks were unable to attract new high quality capital on the capital markets, when their capital vanished into thin air as a result of substantial losses and write-downs. Instead, quite a few SHV needed state support.

levels via the approved method of retaining profits. In conclusion, it is essential that the overall calibration of the Basel package and its phasing-in do not create a non-level playing field to the detriment of cooperative banks. The higher capital requirements and scarcity of capital will undoubtedly raise the price of the most important 'production factor' of banks, which will translate in higher credit interest rates. Like all other banks, cooperative banks will find it more difficult and more expensive to attract funding on the public capital markets.

Another important feature is that current members cannot extract the capital of the bank and gain for themselves an inter-generation transfer: capital belongs to the cooperative bank itself. Capital (reserves) is an endowment to be managed for the benefit of current and future generations of members. Managers of a cooperative bank are effectively managers of an inter-generation endowment. Unlike with SHV banks, ownership stakes are not marketable in that members cannot sell their ownership stakes in an open secondary market but in some cases can sell them back to the bank. Of course, members can withdraw from the bank by withdrawing funds (deposits). In a few cases, however, members may trade membership certificates in a closed market available only to members.

Cooperative banks are only rarely quoted on a stock exchange. In most cases there are no external shareholders/owners who are not themselves members of the cooperative. Because of this, and the absence of a stock exchange listing, there is no market in corporate control in that it is virtually impossible for hostile bids for ownership to take place: a cooperative bank cannot be bought by new owners. This does not mean that there is no need for cooperative banks to operate efficiently. If they are not efficient, they will be wiped out by competitors sooner or later. As argued in Groeneveld and Llewellyn (2011), competition between cooperative banks and their SHV counterparts is a major discipline on all banks competing in the same or similar markets and can certainly compensate for any alleged weaknesses in governance arrangements within both the STV and SHV sectors.

All other things being equal, the cost of capital for cooperative banks is lower than that of SHV banks because, unlike the latter, it is typically not required to remunerate externally held equity capital. This gives the bank a potential margin advantage which can be used in various (good or bad) ways such as higher deposit and/or lower lending rates to members. In addition, mutual support mechanisms between cooperative banks within Central Network Institutions that exist in various countries contribute to high ratings. These collective guarantee schemes reduce, or even exclude, the risk of individual cooperative bank failure. Finally, high capital reserves and high ratings provide cooperative banks with opportunities to obtain relatively cheap capital market funding, because this entails less risks for other creditors and thus lower risk premiums. The available evidence also supports the argument that cooperative banks have relatively easy access to

a fairly cheap, risk-free and stable funding source, *i.e.* a relatively large deposit base. This contributes to a healthy balance sheet composition and high credit ratings (Fitch, 2001 and Moody's, 2003).

The funding situation of ECBGs has always been on a more stable footing than that of other banks. Their loan-to-deposit ratios have always hovered below the average of all other banks in the respective countries, though this gap has narrowed in the last years (Chart 5). This finding reflects the greater focus on retail banking by cooperative banks. From 2001 up to 2006, this ratio has fluctuated just below 1.4 for the category 'all other banks'. In the last three years of the sample, this indicator came down considerably to 1.2, mainly due stagnating credit growth to the non-financial sector. In 2009, the volume of outstanding loans even declined by almost 1 percent at 'all other banks', which clearly mirrored their weakened capital position and limited room to expand their credit portfolio. By contrast, the solid capitalization of ECBGs enabled them to increase their lending to the non-financial sector in the economically dramatic year 2009 by 3.5 percent.

Since deposit funding is part of the current 'back to basics' policy implemented by numerous banks, it will become an even more heavily demanded source of funding in the medium term. The new liquidity requirements under Basel III will also intensify the demand for savings and deposits. However, the crisis has resulted in an increased awareness of differences in risk profiles between banks among the public. In the middle of the crisis, cooperative banks were demonstrably considered as safe havens for deposits. After the normalization of the situation in banking markets, it is an open question whether and how long cooperative banks can benefit from this 'reputation' premium. It is certain that competition between banks will become fiercer (See Chart 5, p. 119).

7.3.5.   Proximity to Customers: Dense Branch Networks

As many cooperative banks are locally based (even though they may be part of a powerful network) they typically have a close proximity to their customers. This gives the bank certain information advantages. Large branch networks also provide cooperatives with an important, albeit declining, comparative advantage in retail markets (see Chart 2). Cooperative banks are literally and figuratively closer to their customers and know those customers well through participation in numerous social networks. This is because the cooperative banking model centres above all on 'relationship banking' via local presence. Proximity to their customers is reinforced by actively supporting local communities. Finally, large branch networks facilitate mobilising and retaining a relatively cheap and important funding source, provided that their deposit rates are competitive with those offered by competitors.

Chart 5: Loan-to-deposit ratios of cooperative banks and national banking systems
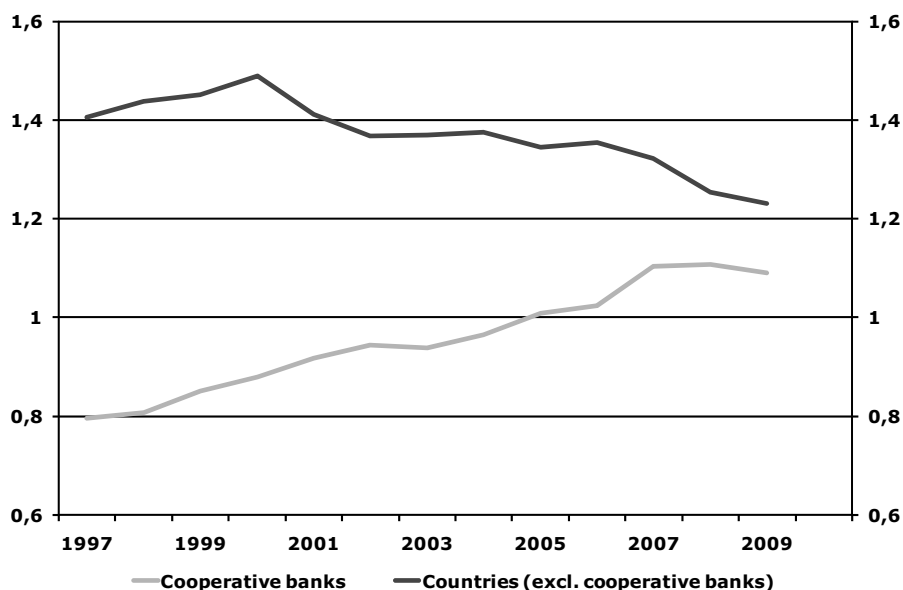
However, local or regional cooperative banks are often part of a network with an integrated structure with extensive vertical and horizontal cooperation via a Central Network Institution (CNI) or APEX. Prime examples include Rabobank, OP-Pohjola and, to some extent, Crédit Agricole and Crédit Mutuel. These institutions centralise the provision of certain services and production processes, especially where benefits of economies of scale are significant. The services and processes provided range from back-office and representation services to others such as centralised product, liquidity and risk management and the role as a supervisor. A unique feature is that such CNIs in some cases (such as Rabobank in the Netherlands) operate as internal central banks within the network of cooperative banks. The APEX institutions are not particularly close to the end-customers and also more difficult to monitor by members due to their remoteness and complex organisation and activities.

7.3.6.   Qualifications of the Cooperative Banking Model and Governance

These observable and actual features are generally considered benefits for cooperative banks, but it is fair to make some important qualifications (Fonteyne,

2007). For instance, it has become more difficult for members to monitor the organisation due to the increased organisational complexity of cooperatives in which management is carried out by dedicated professionals. It is also argued that member ownership makes decision-making slower or hinders innovation and adjustment to new developments. Theoretically, members would have a reduced incentive to stimulate an optimum use of the high capital base (or excess capital), because they mostly do not have a direct claim to the capital (it is 'capital in dead hands'). This could give rise to a risk of opportunistic investments by bank executives outside the traditional core of the ECBGs. Evidence of these suspicions can be found in their foreign operations. Large scale entry of foreign, and thus fairly unknown markets could ultimately endanger the traditional cooperative heart of the organisation. Indeed, a rough historical examination reveals that substantial losses and write downs of ECBGs mostly originated outside the cooperative heart of the organisations. However, in most ECBGs internal and external mechanisms (governance structures) exist to prevent serious agency conflicts that would put the stability of the organisation in peril. Agency problems in SHV banks were actually an important cause of the crisis.

In this respect, it must be noted that the introduction of external shareholders into a cooperative system could create tensions regarding control. If capital is only provided by members, the voting power as member of a cooperative bank and the voting power as capital provider coincide within the same group. When ownership is shared with external capital providers, voting power will also have to be shared. Another qualification is that physical distribution networks of ECBGs imply large fixed costs. At the same time, the distribution of quite some financial products has shifted from expensive physical channels towards virtual channels in the last decades.

7.4.   The Value of ECBGs in National Financial Systems

The financial crisis has shaken up (inter)national banking market structures with far reaching long term implications for competition, capacity, efficiency and profitability in banking. The understandable top priority for restoring and maintaining financial stability has led to large scale government intervention and distorted market conditions for cooperative banks. Be that as it may, regulatory and supervisory responses seem to ignore a very important underlying cause of the credit crisis and of the global financial recession that followed in 2008-09. It concerns the lack of financial diversity within the financial services system as a contributory factor to these developments. Most financial services sectors, and those in the United States and United Kingdom in particular, are dominated disproportionally by a single business model, namely the large, shareholder-owned com-

pany[13]. The purpose of the shareholder value model is simply to maximize financial returns to the shareholders.

This business orientation proved a lethal combination with the deregulation over the past decades, which led to the creation of new financial instruments, and an almost uncontrollable desire to grow fast either organically or via (inter)national acquisitions into large international financial conglomerates. This trend has culminated in banks that are too important to fail and have received disproportionate taxpayer support during the crisis (Bank of England, 2010). These identical business models have caused a gradual and invisible erosion of financial stability until the crisis broke out. This notion appears to be dawning on the European Central Bank as it states that diversity in business models at the macroeconomic level can offer benefits in terms of enhanced financial stability. The ECB adds that: "*if all banks in the system were to have similar business models, their assets would be more likely to be invested in similar activities and, as a consequence, characterized by a larger degree of commonality*" (ECB, 2010b, p. 33).

Part of the problem is that competition has been assessed on false notions for a long time. It has been frequently argued that the number of banking firms determines the level of competition. The crisis has clearly demonstrated the opposite. Competition depends more heavily on the variety in different business models, and surely not solely on the level of concentration. More competition does not result from just adding more firms with the same business model but by also adding firms with different business models to those which are already there. Diversity in ownership and business orientation leads to diversity in risk appetite, management, incentive structures, policies and practices and behaviors and outcomes. It offers wider choice for consumers through enhanced competition that derives in part from the juxtaposition of different business models (Michie, 2010).

Policy makers and supervisors should therefore acknowledge the importance of diversity of ownership types and business models in banking (Ayadi *et al.*, 2010). The crisis has clearly shown the added value or presence value of the cooperative banking model. Fostering diversity in financial services also implies the acknowledgement of the specifics of cooperative banks. By nature, cooperative banks do not pursue highly aggressive growth strategies, which would conflict with their corporate governance and prudent use of their capital. Hence, they stayed well away from critical financial thresholds. Cooperative banks are Stake-Holder-Value institutions with a fairly modest risk appetite.

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[13]   For the United Kingdom, Michie and Llewellyn (2010) propose to convert the failed financial institutions, *e.g.* Northern Rock, into mutual organizations to rebalance the financial sector along more robust and sustainable lines. They assert that diversity of structure, risk taking, corporate behavior and enhancing competition in the financial sector will be promoted this way.

However, the contribution of cooperative banks to banking market structures is only noticeable if the cooperative banking model enjoys a critical mass. This means that financial cooperatives must have a certain market share to enable that model to operate successfully and thus to provide real competitive pressure on the other players within in the market. This is not to argue that the cooperative model is superior to other models, but that systemic advantages accrue through diversity. In addition, Cuevas and Fischer (2006) argue that a financial system that presents a diversified institutional structure, including institutional types, will be more efficient in promoting economic growth and reducing poverty.

The point about the advantages of a variety of business models is closely related to the question of systemic stability. Chart 3 already illustrated that ECBGs performed less badly in the crisis than national banking sectors. The impact of cooperative banks on the stability of national financial systems can be better assessed by calculating the so-called Z-scores. The Z-score is used to analyse the financial soundness of ECBGs versus entire banking system in which they operate. The Z-score is determined by three factors: the return on assets (ROA), the equity capital as a share of assets (E/A) and the stability of the return on total assets (σ(ROA)). The Z-score indicates how many standard deviations from the mean income have to fall to make the institution insolvent by depleting its equity. It is a measure of bank risk and indicates a bank's capacity to absorb deviations in income. The higher the value, the more stable is the bank and the lower is the probability of default (Mercieca *et al.*, 2007*)*. The Z-score is calculated as follows:

$$Z\text{-}score = (ROA + E/A) / \sigma(ROA)$$

Chart 6 plots the average Z-score for a number of ECBGs and for entire national banking systems. In the entire time span, the Z-score of ECBGs is as much as twice as high as the Z-score of the entire banking system. The Z-scores of both categories dropped in 2008, but improved again in 2009. The largest improvement took place at ECBGs. According to this measure, and based on this sample and time series, ECBGs are more stable, which is in line with the findings of existing other studies (Cihák and Hesse, 2007; Beck *et al.*, 2009; Ayadi *et al.*, 2010)[14]. This relative stability could be attributed to the inherently low profitability in good times and the use of consumer surplus as a buffer in hard times to keep proceeds relatively fixed over time. Iannotta *et al.* (2007) also highlight that the better loan quality and lower asset risk of ECBGs is a source of stability.

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[14]   In all countries other than Austria, ECBGs are significantly more stable than entire banking systems. In Luxembourg, the Netherlands and Switzerland, ECBGs enjoy Z-scores which are 70 to 100 percentage points higher than Z-scores of the respective entire banking systems. The entire Austrian banking sector appears to be more stable than both ECBGs (Raiffeisen Banking Group and Volkbanken Group).

Chart 6: Average Z-score for ECBGs and entire banking systems
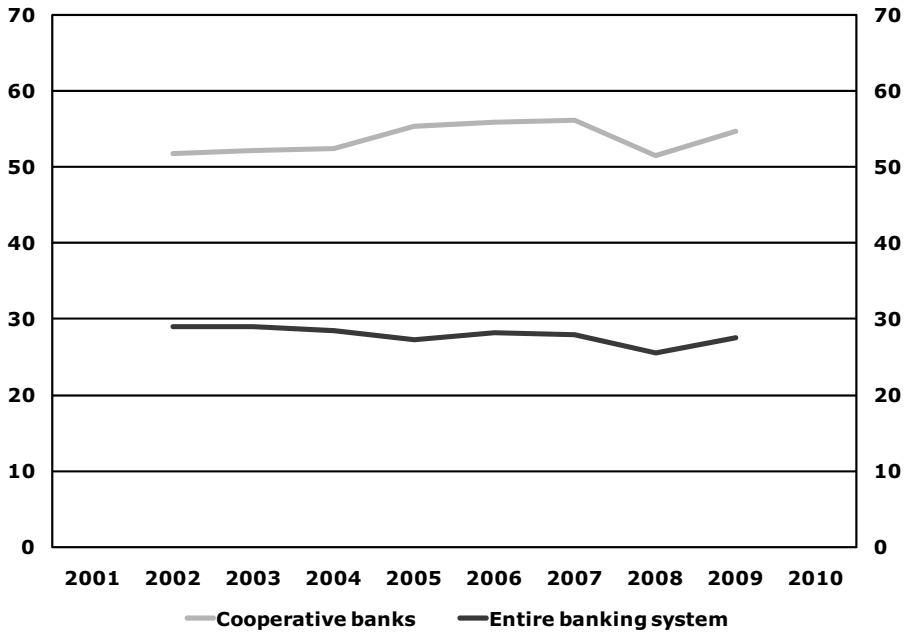
Note: The chart displays data of ECBGs in Austria, Finland, France, Germany, Italy, Luxembourg, the Netherlands, Spain and Switzerland and the entire banking systems in these countries.

In terms of the three components, the ratio of equity/total assets (E/A) at ECBGs is systematically higher (Chart 7). This again supports the notion that cooperative banks maintain larger capital buffers, on average. A notable feature is that the level of E/A declined significantly in the entire banking system since 2003. At the same time, this ratio improved at ECBGs up to 2008. A possible reason is that total assets rose strongly at commercial banks and that they only partly retained their profits according to the wishes of their shareholders. Hence, ECBGs entered the crisis with larger buffers. The drop in the E/A ratio of ECBGs in 2008 can be largely attributed to declining E/A ratios of Austrian and French ECBGs. They suffered substantial capital losses in their foreign, more risky operations. In 2009, all banks made up their capital losses and strengthened their capital position. For the entire banking system, improvements in this ratio were to some extent caused by capital injections and government support.

By contrast, the return on assets (ROA) was somewhat lower for ECBGs up to 2008. This is again a reflection of their business model focussing on the maximisation of customer value. In 2008, the ROA of entire banking systems plunged much stronger than the ROA of ECBGs. In 2009, the ROA of ECBGs and entire

Chart 7: Equity to assets ratio of ECBGs and entire banking systems

— Cooperative banks   — Entire banking system
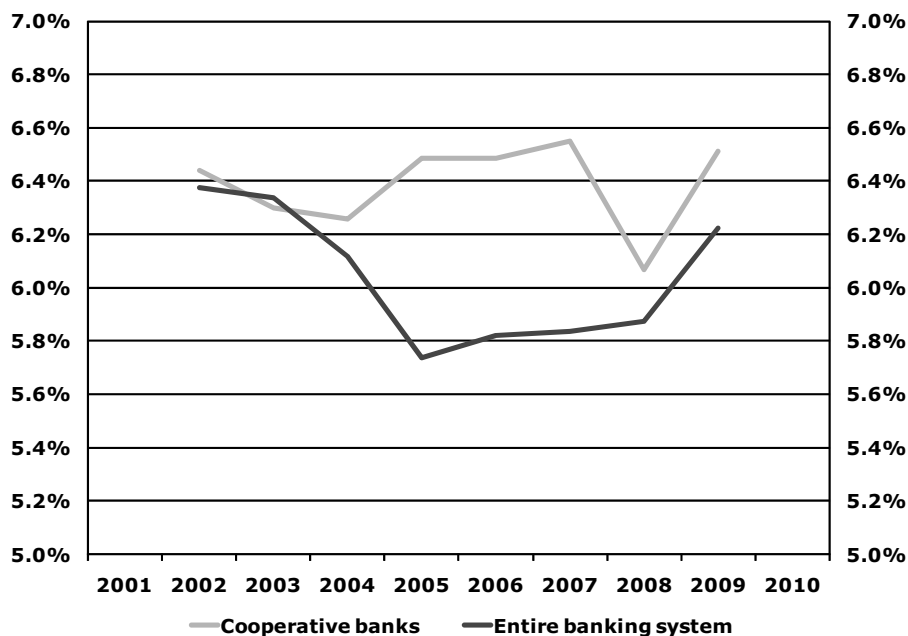
Source: Annual reports of cooperative banking groups and data from national central banks and/or supervisors.

Note: The chart displays data of ECBGs in Austria, Finland, France, Germany, Italy, Luxembourg, the Netherlands, Spain and Switzerland and the entire banking systems in these countries.

banking systems improved again, but did not reach their pre-2008 levels. The third component of the Z-score, the volatility of profits, was on average 25 percentage points lower at cooperative banks in the entire sample, again in line with theoretical expectations. This can be largely explained by the relatively extensive retail operations of ECBGs, which on the whole generate more stable profits in less risky banking markets. In this respect, cooperative banks have possibly an increased ability to smooth their profit streams, giving them an additional boost in terms of stability.

7.5.   Opportunities and Challenges of Financial Cooperatives in the Future Financial System

It is generally accepted that the recent financial crisis will change the economic and political environment of the banking industry stronger than any other event during the last decades. The crisis has brought to light the serious challenges that the European financial services sector is facing. Hence, cooperative banks are confronted with a wide array of far-reaching regulatory and policy measures to

reduce the risk of future financial crises, despite their recent good performance and solid track record. The other side of the picture is that some discussions and proposals hardly apply to cooperative banks. For example, the question of under-capitalization does not really pertain to cooperative banks. Moreover, the possible introduction of general banking taxes or resolution funds could be interpreted as a punishment for 'good and prudent' behavior by cooperative banks and would ignore their stabilizing impact amidst the crisis. The losses and write-downs related to the initial credit crisis were largely suffered outside their traditional home markets and have been completely covered by financial cooperatives themselves (EACB, 2010). Domestic banking based on cooperative principles has proven to be a solid shock absorber and robust backbone of the entire cooperative banking organization.

From these bare facts, it automatically follows that European cooperative banks have contributed to financial stability in their home markets in the middle of the financial crisis. They neither caused nor added to the financial turbulences and following economic recession. This achievement has increased the interest in their banking model among analysts, policy makers and supervisors. Earlier criticism about tedious decision making processes resulting from the cooperative governance (Fonteyne, 2007), inefficiencies in their business and distribution concepts and their potentially detrimental effect on market conditions for other banks (PA Consulting Group, 2003) has died down[15]. The recent performance and decades of experience of prudent management demonstrate the presence and added value of financial cooperatives in national financial systems.

The banking sector will undergo further drastic changes and has to adapt to the long term consequences of the crisis. Competition will increase, operational excellence is necessary, equity and liquidity ratios will – have to – rise and profitability is consequently constrained. Moreover, the influence of economies of scale and scope will become stronger. These changing market conditions and banking structures will have a tremendous impact on financial cooperatives as well. The suggested supervisory, regulatory and policy reforms urge cooperative banks to emphasize their special features and recent achievements and performance. Policymakers and regulators have to be kept aware of the specifics of cooperative banks. It would be unfair if these banks would ultimately become victims of reforms and policy proposals meant to discipline SHV banks that were largely responsible for the emergence of the crisis. Particularly, they should stress their visible contribution to diversity within banking systems. Cooperative banks

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[15]   The line of reasoning of PA Consulting Group (2003) that cooperative banks spoil market conditions for profit or shareholder-orientated banks and may eventually undermine financial stability, is fairly far-fetched and enervated by recent events. ECBGs did not need taxpayer recapitalization and were surely not the cause of excessive risky behavior by commercial banks in the area of securitization or off balance sheet activities to achieve sizeable profits. Cooperative banks simply have a profit target that is based on the objective to serve customers on a continuity basis.

should not stop pushing for establishing an agenda that encourages alternative financial institutions that will provide competition to the commercial banking sector, expand access to financial services and promote stability within the financial sector.

Apart from these necessary efforts to raise the familiarity of the cooperative banking model, the analysis of this paper indicates that ECBGs appear to be well positioned to benefit from the opportunities resulting from the financial crisis due to their long standing business philosophy and good reputation among customers. For instance, ECBGs already comply with most of the 'new' ethical and moral requirements in banking; they already have to take into account the interests of many stakeholders, pursue a low risk business model with a strong retail orientation, have a strong capitalization and do not aim at profit maximization which reduces the probability of excessive risk taking and the existence of exorbitant compensation schemes. Besides, most financial cooperatives have a diversified portfolio of activities. The appreciation of a diversified banking model has increased considerably, because specialized banks were particularly affected by the financial crisis (ECB, 2010b).

But one has to bear in mind that cooperative banking is not by definition better than other banking models and after all, past performance is not a guarantee of future success. Irrespective of the merits and drawbacks of different governance arrangements in the cooperative and SHV sectors in banking, there is merit in diversity. No governance model is unambiguously superior and it needs to reflect the nature and ownership structure of different businesses. Thus, the main conclusion is that cooperative banking is not a panacea for post-crisis banking in general, but should be viewed as a viable, enduring and parallel alternative to the SHV banking model that has been in the spotlight for most of the time in recent decades. There is no presumption that the STV model is to be regarded as the norm as SHV and cooperative banks have equal status as contributors to the services provided by the financial sector of the economy. The strength of competition lies in diversity with different models playing to their particular strengths.

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8. COMPETITION ON THE POLISH BANKING MARKET (BEFORE THE FINANCIAL CRISIS AND DURING THE CRISIS) – EMPIRICAL RESULTS[1]

Malgorzata Pawlowska

Abstract

The aim of this analysis is to assess the changes in the level of competition of the Polish banking sector in the period between 1997 and 2009 (before the financial crisis and during the crisis) with the use of quantitative methods based on the theory of competition measurement in the banking sector (the Industrial Organisation Approach to Banking). In this paper three models have been used for evaluation of the competition: Panzar and Rosse (P-R) model, Lerner index and Boone's Indicator.

The results of the empirical analysis concerning the Polish banking sector demonstrated that between 1997-2007 and 2008-09 (before and during the financial crisis) commercial banks in Poland operated in the environment of monopolistic competition. The level of competition before the crisis in the Polish banking sector was similar to the level of competition in banking sectors of euro zone countries (as indicated by values of the Panzar and Rosse measure).

Results of the competition measurement with all the methods used (P-R method, Lerner index and Boone method) demonstrated a strong increase in competition between 1999-2004 caused by Poland's accession to the EU and slight decrease in competition in 2008-09 caused by financial crisis.

JEL Codes: F36; G2; G21; G34; L1.

Keywords: Competition; Concentration; Market structure, Panzar-Rosse Model, Boone Indicator, Lerner Index.

Introduction

In the period of 1997-2009 rapid changes were made in the Polish banking sector when the ownership structure changed and consolidation processes intensified. However, it should be noted that consolidation processes in the Polish banking sector were to a great extent a natural consequence of the earlier privatisation of domestic banks and attracting strategic investors for those banks as well as the fact that an increased number of mergers took place in the euro zone countries. Due to the fact that foreign capital in banks operating in Poland comes largely from the euro zone countries, the factors that triggered changes in the competi-

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[1] The views expressed in this paper are the views of the author and do not necessarily reflect those of the National Bank of Poland.

tion in banking systems of the euro zone countries also had an indirect impact on the Polish banking sector.

The aim of the study is to estimate the level of competition in the Polish banking sector in 1997-2009 (before the financial crisis and during the crisis) with the use of quantitative methods based on the theory of competition measurement in the banking sector (the Industrial Organisation Approach to Banking). The degree of competition in the Polish banking sector was estimated with the use of three models: Panzar and Rosse (P-R) Model, Lerner index and Boone's method. In order to determine the impact of the establishment of the euro zone (in 1999) and the accession of Poland to the European Union (1 May 2004) and financial crisis (between 2008-09) on changes in the level of competition, the latter was measured for the following periods: 1997-98[2],1999-2003, and 2004-07[3], 2008-09[4].

Between 1997 and 2007 (before the financial crisis), competition in the Polish banking system was the effect of numerous different determinants, such as globalisation, deregulation, progress in IT technologies, progress in European integration, implementation of FSAP programme and implementation of the New Capital Accord (Basel II). Between 2008-09, the main source of short and mid-term threats for Polish economy, and thus for banking sector were external factors, caused by 'subprime crisis' in 2007 which in 2008 transformed into global crisis of the financial system. In 2009 very strong disturbance in functioning of financial markets slowly started to transfer to the real economy. Thus the financial crisis transformed into an economic crisis. Between 2008-09, also the financial crisis had the main impact on the competition in the Polish banks.

Liberalisation had an impact on the increase in the competition of the financial intermediaries and also on the financial crisis. The same channels (before the crisis – increase in mergers and acquisitions and deregulation and during the crisis – increase in mergers and acquisitions as well and new regulations) which affected changes in the competition of banking sectors in the euro zone countries, affected the Polish banking sector due to the involvement of capital from the euro zone.

The results of the empirical analysis concerning the Polish banking sector demonstrated that between 1997 and 2009 (before and during the financial crisis) commercial banks in Poland operated in the environment of monopolistic competition. The level of competition in the Polish banking sector was similar to the level of competition in banking sectors of the euro zone countries (as indicated by values of the Panzar and Rosse measure). Results of the competition measurement with all the methods used (P-R method, Lerner index and Boone method) demonstrated a strong increase in competition between 1999-2003 caused by

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[2]   Period prior to euro introduction.
[3]   Period after the accession of 10 new countries (including Poland) to the European Union.
[4]   Period of financial crisis.

Poland's accession to the EU and slight decrease in competition between 2008-09 caused by the financial crisis.

The study consists of four parts and a summary. The first part presents the broad scope of the research methods for the measurement of competition. The second part contains an overview of the literature concerning competition measurement in EU banking sectors. The third part describes structural and technological changes in the Polish banking sector in 1997-2009 causing changes in competition. The fourth part presents the results of the analysis of changes in the degree of competition of the Polish banking sector (based on data from balance sheets and profit and loss accounts of commercial banks) with the use of three models: Panzar and Rosse (P-R) model, Lerner index and Boon's indicator. The last part presents conclusions.

8.1.   Methods of Competition Measurement

Competition in the banking sector is analysed through the market force and effectiveness measure. Research on competition is currently conducted as part of the industrial organisation approach to banking.

The following research trends can be distinguished in literature concerning the research on competition: a trend developed on the basis of economic theories investigating the Industrial Organisation (IO)[5] and the New Empirical Industrial Organisation Theory (NEIO). The traditional IO theory comprises the following theories: structure-conduct-performance paradigm (SCP) describing the relationship between the market structure, company conduct and the performance, and a theory based on the efficient structure hypothesis (ESH).

The structure-conduct-performance paradigm (SCP) based on testing the relationship between the market structure, company conduct and its performance, was defined by Bain (1951), thus concepts such as Bain's research programme or Bain's paradigm are also found in the literature. According to this approach, market performance depends on the market conduct which is determined by the main elements of the market structure determining its competitiveness. Under the SCP theory the mechanism of the market structure's influence on competitive conduct and the results of management come down to a conventional approach to the relationship between the level of competition and the market structure. This approach is based on the assumption that a higher concentration is accompanied by lower competition between companies. The above theory assumes that the

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[5]   In the above theory that deals with market organisation and competition, behaviour of firms is investigated under certain limitations imposed by consumers and competitors. The central issue of this theory was an expansion of the micro-economic analysis with imperfectly competitive markets and the main model discussed in this theory is the oligopoly model. *Cf.* Łyszkiewicz (2002).

probability of collusion is higher in a more concentrated system. Market collusion leads to higher prices (increase in margins) for consumers and higher business profitability for firms (banks).

The theory based on the efficient structure hypothesis was developed by economists connected with the Chicago School: Demsetz (1973) and Peltzman (1977). The authors of the ESH theory proposed a different approach to explaining the relationship between the market structure and firm performance, *i.e.* an approach based on the efficiency. The theory based on the ESH also defines a positive influence of concentration on the performance, similarly to the SCP theory, however the justification for that phenomenon is different. According to the ESH theory, more efficient firms have lower operating costs and therefore achieve higher profits. In addition, the ESH theory assumes that if a firm (bank) is more efficient than other competitors, it must choose between two mutually exclusive strategies. The first strategy concerns the maximisation of profit for shareholders by maintaining existing prices and the firm's size. According to the other strategy, profit maximisation consists in price reduction, thus in increasing the firm's market share. Under those assumptions, increasing efficiency of firms leads to higher concentration. Therefore, the size of the market share reflects approximately the degree of business efficiency and for this reason it is positively correlated to the profitability. According to the ESH, concentrated markets are markets where highly effective firms (banks) operate. However, higher profits of firms with high market shares do not result from their power (size) but from higher effectiveness which creates their power. It should be noted, that the ESH theory was criticised by some economists who proved that its theoretical and empirical foundations are weak because concentrated markets are relatively less efficient.

Both in the SCP model and the ESH model the measures of market concentration (*i.e.* CR_k and Herfindahl-Hirschman indices) are used for explaining reasons for non-competitive behaviours and are also treated as measures of the consequences of different efficiency of market players[6]. Both in SCP and ESH models, empirical research consisted in adopting a specific initial market structure and in formulating and testing hypotheses on the basis of the sign and value of individual parameters in the models. As a consequence of using such methodology, the market structure, determining the behaviour of firms, was usually used in structural models as an exogenous variable.

An incentive for developing a new analytical theory of competition (NEIO) in the early 1970s was abstracting the market structure as an endogenous variable. The authors of the new theory dealing with market organisation and competition stated that the market form is created evolutionarily and depends on many market characteristics as well as strategic behaviours of firms/banks themselves.

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[6]   Pawłowska (2005), p. 12.

According to NEIO, the concentration is an endogenous variable and depends on the behaviours of individual market players that are exogenous from the firm's perspective (Breshnahn (1988)).

Methods based on NEIO do not take into account the direction of changes in the level of concentration and they presume that the degree of competition does not always depend on concentration measures because other market characteristics, such as dynamic barriers to entry and exit, are more important. According to the new NEIO competition theory, when assessing the intensity of competition two factors should be assessed jointly: the level of concentration and the scope of the possibility to enter a particular industry, determined by dynamic barriers to entry. Therefore, structural concentration measures are excluded in the measurement of the competition level.

In the contestable markets theory (CMT), proposed for the first time by Baumol (1982), regarded as a non-structural model, authors *explicitely* take into consideration strategic behaviours of firms/banks and the presence of potential competition. According to CMT, the absence of barriers to entry and exit forces an already existing firm to take into account the possibility of new firms entering the market (potential competitors)[7].

Methods based on the new empirical industrial organisation (NEIO) include the Iwata method (1974), Bresnahan (1989) and Lau method (1982), and Panzar-Rosse (1987) model, the Panzar and Rosse provided a measure called the H statistic[8]. The Panzar and Rosse approach (P-R) also has some limitations: general limitations are the assumptions underlining its use as a measure of competition in banking industry as well as the resulting biases. Furthermore, Bikker *et al.* (2007a) provided empirical evidence that the level of competition in the banking industry in the existing empirical P-R literature is systematically overestimated. The reason for the misspecifications is that most studies use different definitions of the appropriate variable to represent banks' revenue (most studies use scaled versions of bank income as the dependent variable in the P-R model and work with revenues divided by total assets, but scaling changes the nature of the model fundamentally, since it transforms the revenue equation into a price equation). However, despite these limitations, the P-R model has been extensively applied to the banking sector in a number of countries.

Alternative indicator of the degree of competition in banking markets based on the NEIO theory empirical research is the estimation of the Lerner index, widely used in the specific case of banks on the basis of the Monti-Klein oligopolistic model[9]. In the Lerner index, it is the mark-up of price (average revenue) over

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[7]   Łyszkiewicz (2002), p. 266.
[8]   For more formal specification see: Bikker (2004, pp. 85-86).
[9]   Freixas and Rochet (2008), pp. 72-73.

marginal cost and the divergence of price. The higher the mark-up, the greater is the realized market power.

Recently, literature on the measurement of competition in the banking sector uses, apart from a widely used Panzar-Rosse measure (1987) and the Lerner index, the so-called Boone indicator, proposed by Boone (2000), which is based on the ESH. Boone assumed that more efficient firms (with lower marginal costs) have greater market power and thus achieve higher profits. The higher the competition, the stronger this effect is. In order to support this quite intuitive market characteristic, Boone developed a broad set of theoretical models (see Boone, 2000, 2001 and 2004). Boone proved that the market shares of more efficient banks (that is, with lower marginal costs MC) increase both under regimes of stronger substitution and amid lower entry costs (see. Leuvensteijn *et al.* (2007)). Of note is that the Boone indicator model, like every other model, is a simplification of reality. Efficient banks may choose to translate lower costs either into higher profits or into lower output prices in order to gain market share. Hence, like many other model-based measures, the Boone indicator approach focuses on one important relationship, affected by competition, thereby disregarding other aspects (see also Bikker and Bos, 2005).

8.2.   Results of the Measurement of Competition in European Banking Sectors – Overview of Literature

The importance of competition in the financial sector is the subject of research by bank analysts because the degree of competition in the financial sector may influence the effectiveness of financing and availability of financial services to companies and households and may have an impact on the quality of products but more competitive pressure may increases the probability of a crisis). Empirical cross-country investigation in this research area related primarily to the issue of the influence of competition in the financial sector on its stability, the access to external financing and the economic development. In addition, the relationship between market concentration, market regulation and the level of competition was analysed.

The establishment of the euro zone also posed a challenge to analysts conducting research on the degree of competition. It was expected that accession to the euro zone would increase competition in the financial sector, exert pressure on banks' profitability, causing an increase in the efficiency of financial institutions (ECB 1999). It was argued that the accession to the euro zone would change the position of the bank being the main financial intermediary (disintermediation), which might cause changes in the financial result and an increase in competitive pressure from the capital market (McCauley and White 1997). In view of these challenges,

the banking system of the euro zone countries undertook appropriate strategic precautionary measures to increase the effectiveness by, among others, improving the quality of services, reducing costs, developing alternative sources of income through geographic expansion (ECB 1999). Banks became involved in mergers and acquisitions, in particular cross-border M&A transactions, and entered into strategic alliances[10]. The greatest wave of mergers was recorded just before euro adoption and in subsequent years the pace of consolidation slowed down. However, the number of financial institutions in the euro zone has been decreasing continually.

It should be noted, however that the number of empirical studies concerning solely changes in the competition in the financial sector in the Economic and Monetary Union (*ex post*) on the basis of quantitative methods is not high and panel studies (cross-country) are still at their initial development phase and no unequivocal conclusions have been made yet. The majority of papers written so far concerns a broad issue of the financial integration.

One of the few empirical studies using cross-country statistics that relate specifically to the impact of joining EMU on increased competition in the financial sector was carried out by Utrero-Gonzalez and Callado-Muñoz (2007). Using a comparative analysis of changes in the degree of competition of the banking sectors in the euro and the non-euro area countries, and the P-R methodology, the authors demonstrated a positive impact of the single currency on increased competition in the euro area banking sector. Furthermore, Boucinha and Ribeiro (2009) confirmed increase in competition in the Portuguese banking system due to the euro area participation, as well Luis Gutiérrez de Roza (2007) for Spanish banks. Increased competition in the credit market in the euro area countries was also reported by Leuvensteijn *et al.* (2007). Leuvensteijn *et al.* (2007) were the first which applied a new measure of competition – the Boone indicator – in the credit market in the euro area countries. However, the paper pointed to differences in the degree of competition among the euro area countries.

Another issue, is the link between competition and concentration. A number of analysts, who investigated the trade-off between competition and concentration, found that there is no evidence that banking sector concentration negatively relates to the level of competition, Gelos and Roldos (2002) using the P-R methodology and BankScope data, found that banking markets in Central European countries (including Poland), did not become less competitive, even though concentration increased. Above results were confirmed by Yildrim and Philippatoas (2007) and by Claessens and Laeven (2004) on cross-country research (including

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[10]   In 2005 cross-border transactions accounted for 51% of total M&A transactions – due to the merger of Unicredito and HypoVerensbank, ABN Amro and Banca Antonveneta as well as Swedbank and Hansabank.

Poland). Hempell (2002) reached a similar conclusion related to the German banking industry and Coccorese (2004) related to the Italian banking industry. Fillipaki and Staikouras (2006) showed that banks in the new EU countries, among others in Poland, operate under conditions of stronger competition than the old EU countries, due to lower market entry barriers and the presence of foreign capital.

A cross-country analysis for Central and Eastern European countries was also conducted by Philippatos and Yildirim (2003) between 1993 and 2000 and by Koutsomanoli-Fillipaki and Staikouras between 1998 and 2002. The results of their analyses indicated there existed monopolistic competition in most analysed banking sectors in Central and Eastern European countries. In addition, Koutso-manoli-Fillipaki and Staikouras (2006) concluded that between 1998 and 2002 only in EU-10 countries, due to lower barriers to entering the market and an increase in the share of foreign capital, the increase in concentration did not cause a decrease in the level of competition in the analysed period.

Bikker (2004) reported that Herfindahl-Hirschman (HHI) indices and the *k* bank concentration ratios (CR_k) tend exaggerate the level of competition in small countries and are increasingly unreliable when the number of banks is limited. However in recent papers, Bikker *et al.* (2006) and (2007a), (2007b) demonstrated that the level of competition in the existing P-R literature was systematically overestimated (all 28 studies considered – included above mention studies – suffered from these types of misspecification). The reason of this misspecifications was that the most studies used scaled version of bank income as the dependent variable in the P-R model and work with revenues divided by total assets. With the correctly specified P-R model Bikker *et al.* proved that monopoly or perfect cartel cannot be rejected in 28% of the analyzed countries (against 0% in the misspecified model). They analysis has made clear that further consolidation would reduce competition among banks, which would impair the welfare of consumers and companies.

Finally, Bikker and Spierdijk (2008) who were the first to analyse changes in cross-country competition in 101 countries in the period of the last 15 years, using proper dependent variable in P-R model, found significant changes in the degree of competition in the analysed countries. In addition, they reported a decrease in competition in the banking sector of Western Europe (in particular, in the euro area) and an increase in competition in the banking sectors of Eastern Europe and that the degree of competition between banking sectors of the 'old' and the 'new' EU levelled off. The reason for the decrease in competition in the banking sector of Western economies was, on the one hand, the establishment of very large banks with considerable market strength. On the other hand, the change of the banks' role as the key financial intermediaries, owing to the increas-

ing significance of the capital market in lending to enterprises and the increase in banks' non-interest income.

Using the Lerner index, Angelini and Cetorelli (2003) demonstrated an increase in competition despite an increase in concentration in the Italian banking sector (between 1984 and 1997 the market power decreased); de Guevara *et al.* (2004) demonstrated an increase in competition between 1992 and 1999 in Germany and UK; Fischer and Hempell (2005) confirmed an increase in competition in the German banking sector between 1993 and 2001. However, de Guevara and Maudos, (2004, 2007); de Guevara *et al.*, (2007); Carbó and Rodrıguez, 2007; found the reduction of competition during the 90s and higher Lerner index in EMU countries.

Finally, Carbó *et al.* (2009) found using five measure of competition (net interest margin (NIM), Lerner index, return on assets (ROA), *H*-statistic, HHI market concentration index) that the various indicators of competition yield different results about competitive behaviour due to that fact that those competition indicators measure different things.

8.3. Structural and Technological Changes in the Polish Banking Sector between 1997 and 2009

Deregulation in 1989 radically restructured the banking system in Poland[11] and in the majority of the new EU countries. It started the process of privatization and consolidation of the banking industry, previously dominated by very few government-controlled banks. Currently, the financial system in Poland is mainly based on commercial banks whose share in assets of the financial sector as a whole is approximately 70%. The role of other financial institutions has been increasing steadily, although it is still low.

The period of 1997-2009 was a period of rapid changes in the Polish banking sector when the ownership structure changed and consolidation process intensified. However, it should be noted that the consolidation process in the Polish banking sector was to a great extent a natural consequence of the earlier privatisation of domestic banks and the attracting of strategic investors for those banks as well as the fact that an increased number of mergers took place in euro zone countries. Due to the fact that foreign capital in banks operating in Poland comes largely from the euro zone countries, the factors that triggered changes in the competition in the banking systems of euro zone countries also had an indirect impact on the Polish banking sector.

When analysing processes that took place in the Polish banking sector between

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[11]   In 1989 a two-tier structure of Polish banking was established, with 9 regional commercial banks.

1997 and 2009 it should be noted that privatisation led to an increase in the share of foreign capital in the Polish banking sector. As of the end of 2009, the share of banks with predominantly foreign capital was approximately 70%, while as of the end of 1997 it was approximately 15% (see figure 1). When analysing ownership transformations in the Polish banking sector in recent years, the stabilisation of the share of foreign capital since 2000 should be emphasised. In 2009, foreign investors controlled 39 commercial banks and all branches of credit institutions. Their market share measured by assets amounted to 68.1% (the dominant role was played by Italian investors who controlled 13.3% of the sector assets, followed by German (9.9%), Dutch (8.7%), American (7.4%) and Belgian (5.7%)), see: figure 2[12].

The consolidation in the Polish banking sector (similarly to euro zone countries) led to changes in concentration. The analysis of the variability of concentration ratio in the Polish banking sector shows that in part of the analysed period (1997-2001) those ratios followed an upward trend due to mergers and acquisitions (M&A) conducted by large banks which were influenced by international consolidation. The study of M&A processes in 1997-2001 showed the following types of mergers in the Polish banking sector: merger between a Polish bank acquired by a foreign investor and a foreign bank operated subsidiary in Poland[13], merger between two Polish banks having a common foreign shareholder[14], merger between banks operating within the same capital group[15], merger between banks in Poland initiated by merger of shareholding banks outside Poland[16].

In turn, between 2002 and 2007 concentration measure was decreasing. The decrease in concentration ratios was caused by a slowdown in the consolidation process and a slower development of large banks. In the period 2008-09 as a consequence of the crisis, due to the strategy weakening of the financial condition of the parent company, changes of strategic investors of Polish banks happened and the consolidation process intensified[17].

Due to consolidation activities in 1997-2009, the number of Polish commercial banks significantly dropped, but at the same time the number of branches increased (it should be noted that the number of branches includes branches of foreign credit institutions, 18 in 2009, and their market share was 5.1%) see

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[12]   See: Polish Financial Supervision Authority, Report on the condition of Polish banks in 2009, pp. 42-44.

[13]   For example: Citibank (Poland) SA merged with Bank Handlowy w Warszawie SA, and both banks are controlled by Citibank Overseas Investment Corp.), acquisition of ING Bank N.V. Oddział w Warszawie by ING Bank Śląski SA owned by ING Bank NV.

[14]   For example: merger of the Bank Zachodni SA and Wielkopolski Bank Kredytowy SA, both controlled by Allied Irish Bank European Investments Ltd.

[15]   For example: acquisition of the banking group Pekao SA which was formed from four state banks that were part of this group.

[16]   For example: merger of Powszechny Bank Kredytowy SA with Bank Przemysłowo Handlowy SA as the result of the merger of shareholders – Bank Austria Creditanstalt and HypoVereinsbank.

[17]   For example: M&A between GE Money Bank and Bank BPH, Dominet Bank with Fortis Bank and Cetelem Bank with Sygma Bank branch in Poland.

figure 4[18]. Despite the dominant role of several large banks, the level of concentration of the Polish banking sector remains moderate in comparison with other EU countries. At the end of 2009, the share of the five largest banks in assets in the banking sector was 44.5%. Changes in concentration in the Polish banking sector measured with CR5 ratio are illustrated in figure 3. PKO BP and Pekao remain unquestionable leaders on the market, their total share in the banking market exceeds 25%[19].

Figure 1: Share of foreign investors in assets of the Polish banking sector (1997-2009), in (%)
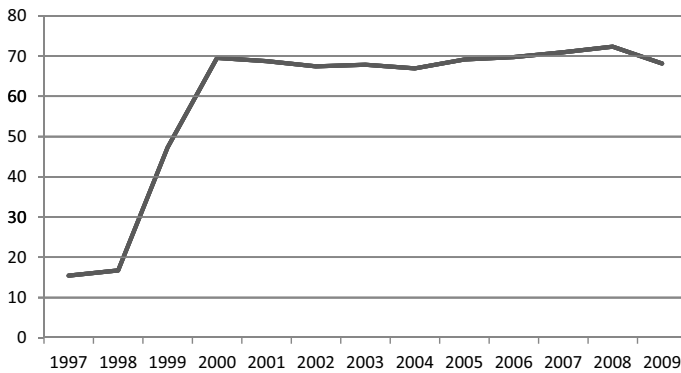
Source: NBP and FSA.

Figure 2: Share of foreign investors in assets of the Polish banking sector in 2003, 2007 and 2009 by country of origin, in (%)
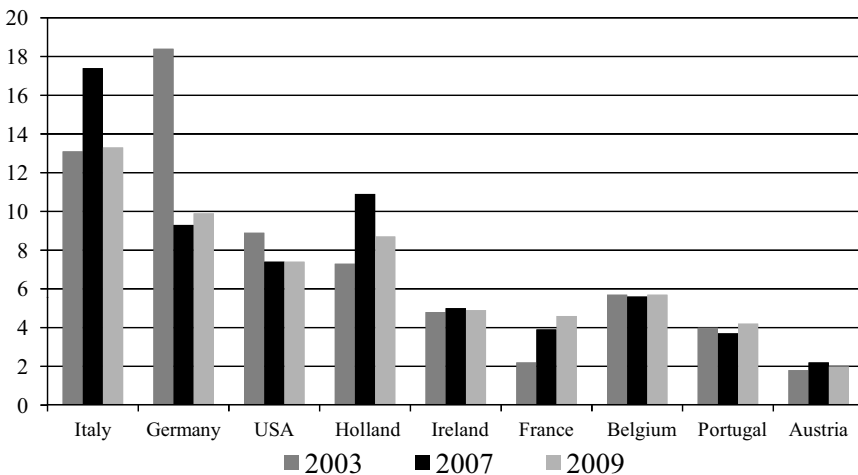
Source: NBP and FSA.

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18   But, in 2008 the number of Polish commercial banks increased from 50 to 52, as a result of commencement of operations by Alior Bank and Allianz Bank Polska, in 200, due to the new wave of consolidation processes in the Polish banking sector the number of commercial banks decreased.

Figure 3: CR5 ratio in the Polish banking sector (1997-2009), in (%)
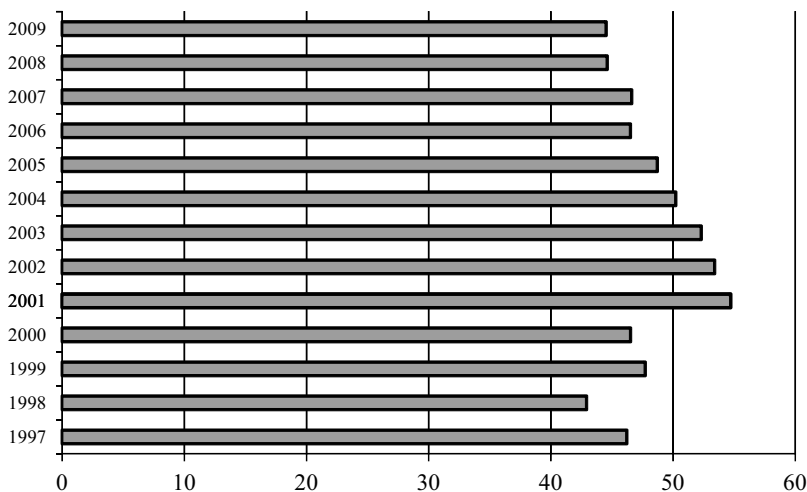
Source: NBP and FSA.

Figure 4: Number of commercial banks and branches in Poland (1997-2009)
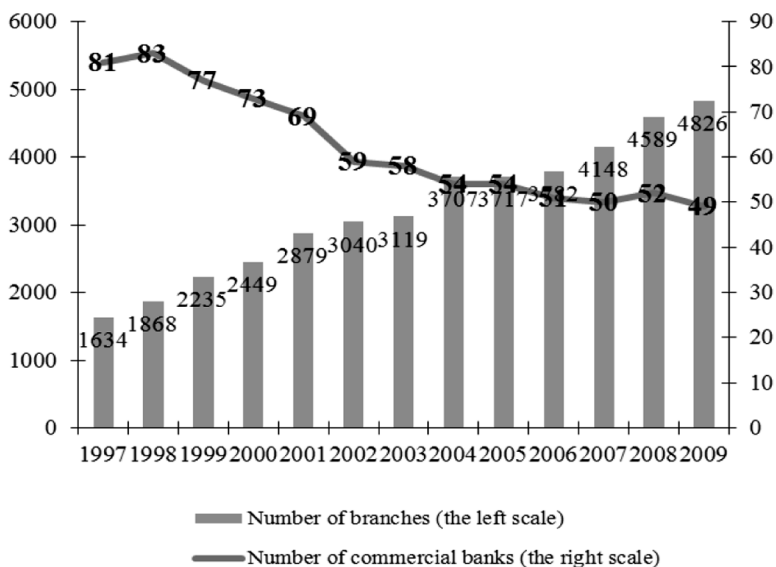
Source: NBP and FSA.

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[19]   See: Polish Financial Supervision Authority, Report on the condition of Polish banks in 2009, pp. 23-24.

The period of 1997-2009 was also a period of the development of electronic technology in banking. Owing to new technical solutions banks were able to improve the quality of their operations, streamline settlement procedures and accelerate cash turnover. In the last decade, technical solutions (including the development of IT technologies and the Internet) became an important internal factor enabling banks to improve their management systems and contributed to the development of modern banking products and their distribution channels.

An important (possibly the most important) factor which influenced the shape of the banking sector in the analysed period was Poland's accession to the European Union. Owing to this fact, Polish financial law was harmonised with European Union regulations. It should be noted that as of the date of Poland's accession to EU, one of the entry barriers[20] for EU banks was removed as a result of introducing a single passport law in Poland[21].

Other factors driving recent changes in the banking sector were the introduction of the New Capital Accord (NCA) (Basel II) and implementation of FSAP programme. NCA was implemented in Poland in 2007, while the possibility to use IRB approach in banks was introduced as of 1 January 2008[22]. It should be stressed, that in 2009 The Basel Committee issued a final package of measures to enhance the three pillars of the Basel II framework and to strengthen the 1996 rules governing trading book capital. These measures were originally published for public consultation in January 2009.

The profitability of commercial banks in Poland between 1997 and 2009 was influenced by a large number of internal and external factors: consolidation and technological processes, real economy, Poland's accession to the European Union and the financial crisis. After a significant decrease in the profitability of commercial banks between 2001 and 2003 related to the economic slowdown, between 2004 and 2007 a clear improvement in profitability was observed (the improvement in banks' profitability was facilitated by, among others, a decrease in the share of non-performing loans[23] in assets, in particular loans granted to companies). the slight decrease in the profitability indicators in the period 2008-09 caused by financial crisis (see figure 5), it should be noticed.

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[20] Bikker and Bos (2005), p. 39.
[21] Pursuant to the single passport rule, a credit institution which obtained a banking licence in one EU country may undertake and conduct the activity in the territory of another EU country, without having to undergo another licence procedure. The credit institution is only required to notify the banking supervisor of the host country of its intention to undertake the activity in its territory. See NBP (2004).
[22] In Poland, draft legal acts were developed which govern the new manner of risk management in banks on the basis of draft EU directives (directives 2006/48/EC and 2006/49/EC). This concerned a draft amendment to the Banking Law act and drafts of new resolutions of the Commission for Banking Supervision (including Resolution No. 1 to 9 of 13 March 2007).
[23] It should be noted that since Poland's accession to the EU the classification of non-performing loans changed to a less restrictive classification, for instance for sub-standard receivables from 1 to 3 months into from 3 to 6 months, for doubtful receivables from 3 to 6 months into from 6 to 12 months, for lost receivables from above 6 months to above 12 months. See NBP (2003).

Figure 5: Commercial Banking Sector's Efficiency Indicators in Poland 1997-2009 (%)
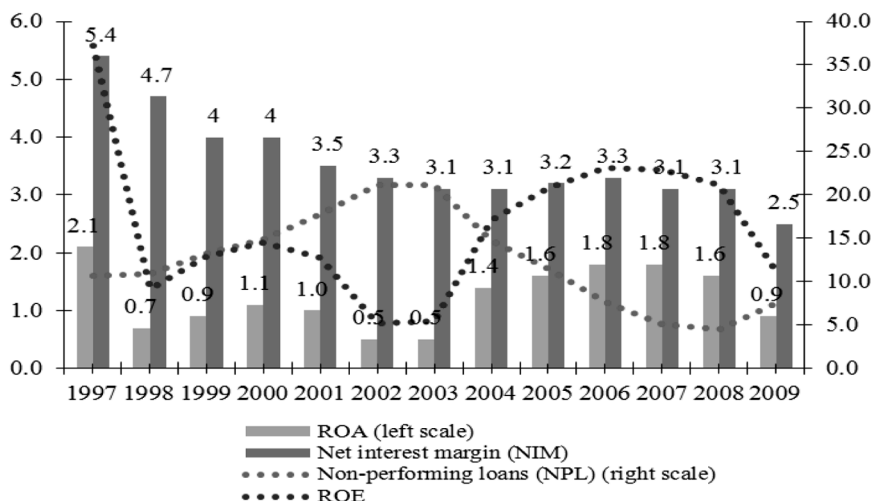
Note: Net interest margin (NIM) = net interest income (interest income minus interest expenses) over average assets. Non-performing loans (NPL) = the share of loans which are classified as: substandard, doubtful and loss, in total assets.

During the analysed period a downward trend of the net interest margin (NIM) was also observed. In the Polish banking industry, similarly to other EU countries, a downward trend for this factor was observed, but it was two times higher than the average in EU-25[24].

In 2008, the turbulences on the global financial market, which was reflected at the Polish level as lower confidence between financial institutions, led to obstacles in the liquidity management and risk hedging, as well as emphasised the need to focus on obtaining long-term and stable sources of financing. In 2008, banking operations can be divided into two periods. The first period, covering the three first quarters, was characterized by fast development thanks to relatively favorable macroeconomic conditions. The second period covered Q4 and featured a significant slowdown of lending activity and a deterioration in banking performance due to the 'second wave' of the financial crisis, deteriorating financial situation of certain borrowers. As a result of the crisis escalation a sharp increase in rates occurred on the interbank market and difficulties appeared in managing current liquidity and securing the risk. In order to stabilize and improve the situation on the financial market the National Bank of Poland developed a so-called 'Confidence Pack-

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[24]   In 2001 the average net interest margin for EU countries was 1.51%. See ECB (2003). In 2004 the average net interest margin for Germany was 0.89%, for Spain 0.95%, while for Italy it was 2.48%, see Banque de France Bulletin (2005). During the analysed period, the decrease in net interest margin in Poland was also caused by a decrease in nominal interest rates resulting from a lower inflation rate.

age' which enabled banks to expand the possibilities for banks to obtain liquidity in zloty and also the Polish Government took legislative activity[25].

In 2009 the accumulation of adverse events translated into a significant worsening of effectiveness measures of the banking sector. In particular, due to reductions in the NBP interest rates, and the growth of unsupported loans, interest margins declined. The decrease in ROA was also the consequence of the declined performance of banks. The quality of credit portfolio of banks strongly deteriorated in 2009, the portfolio of non-performing loans increased by 76.1%[26]. However, despite the strong deterioration in financial performance, the situation of the banking sector was quite stable in 2009, also in terms of liquidity. The main source of risks was inadequate lending procedures. In response to the identified phenomena of loosening credit policy standards for retail loans, the PFSA adopted Recommendations that were quickly implemented into banking practice.

8.4. Analysis of the Level of Competition of the Polish Banking Sector between 1997 and 2009 – Empirical Results with Use of Three Different Models

8.4.1. Results of Competition Measurement with the Panzar and Rosse Method

In this chapter, the level of competition of Polish commercial banks was evaluated. In order to estimate the H-statistic for the Polish banking sector, the following reduced form revenue equation was estimated (for details see also Bikker and Bos, 2008, Claessens and Laeven, 2004, Yildrim and Philippatoas, 2007):

$$IR_{it} = \alpha + a_1{}^* \ln w_{lit} + a_2{}^* \ln w_{pit} + a_3{}^* \ln w_{cit}$$
$$+ \eta(OI/II)_{it} + \sum_{j=1}^{N} b_j{}^* oth_{it} + \varepsilon_{it} \tag{1}$$

dependent variable:
IR_{it} – the natural logarithm of interest income $\ln(II)_{it}$ or the natural logarithm of interest income divided by total assets $\ln(II/TA)_{it}$ of bank i in time t.

the price of input is defined as follows:
w_{lit} – the *price of labour* is the ratio of personnel expenses to total assets of bank i in time t;
w_{pit} – the *price of funds* is the ratio of interest expenses to total deposits of bank i in time t;

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[25] See: Polish Financial Supervision Authority, Report on the condition of Polish banks in 2008, pp. 32-38.
[26] See: Polish Financial Supervision Authority, Report on the condition of Polish banks in 2009, pp. 42-44.

w_{cit} – the *price of capital* is the ratio of other operating and administrative expenses to fixed assets of bank i in time t.

other bank specific variables:
$(OI/II)_{it}$ – other income/interest income of bank i in time t[27],

$\sum_{j=1}^{N} oth_{it}$ – other bank-specific variables that affect long-run equilibrium bank revenues: the share of loans which are classified as: substandard, doubtful and loss, in total assets, the ratio of loans to total assets, the ratio of deposits to total assets, the ratio of fixed assets to total assets, of bank i in time t,

α – is a constant term, ε_{it} – error,

The sum of the factor prices function (denoted with the coefficients a_1, a_2 and a_3) of the reduced-form of revenues (see equation (1)) constitutes the value of the H-statistic for the Polish banking industry. To assess the impact of misspecification, two variants of equation (1) were estimated. The first variant explains the natural logarithm of interest income divided by total assets $\ln(II/TA)_{it}$ as a dependent variable, whereas the second model was based on the natural logarithm of interest income $\ln(II)$. The panel data for this analysis comprises all Polish commercial banks for each year (see figure 4) covered by the National Bank of Poland's balance sheet and income statement. These statistics consist of annual data from all banks reporting to the National Bank of Poland and cover the period from 1997 to 2009.

In order to check the assumptions of the P-R method on a long-run equilibrium in the Polish banking sector, a test was performed by inserting ROA for 1997-2009 in place of the dependent variable in equation (1) (results of the above tests are presented in table 1). After replacing the dependent variable with ROA or ROE, the value of H statistic equals to 0 means that the banking system is in a long-run equilibrium[28].

Table 1. Value of the Wald test to determine a long-run equilibrium in the Polish banking sector between 1997-2009, H_0: H = 0, H_1: H < 0

ROA	Wald test value for H = 0
H Statistic value:	Probab.
0.03271893	0.5681

Source: Own calculations.

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27   With the aim to capture the increasing role of non-interest revenue in banks' income.
28   This test can be easily performed with the use of the above ratios because in the long-run equilibrium profits are equal to zero and both in the case of ROA and ROE they do not depend on input prices. Based on the Wald test performed, the hypothesis on a long-run equilibrium in the banking sector at a conventional significance level cannot be rejected, which means that the condition for applying the Panzar and Rosse method is satisfied.

In order to analyse changes in the level of competition in the Polish banking sector the value of *H statistic* function was calculated for the entire period analysed (1997-2009) and sub-periods: 1997-98 (H_1), 1999-2003 (H_2), 2004-07, (H_3) 2008-09 (H_4). In order to estimate the elasticity of the revenue function the model of an analysis of panel data depending on the value of Hausman test was used[29]. Values of *H statistic* for 1997-2009 and for each of sub-periods for two dependent variables ($\ln(II/TA)_{it}$, $\ln(II)$) are presented in table 2.

Table 2: Value of H statistic for commercial banks operating in Poland

Sample:	1997-1998	1999-2003	2004-2007	2008-2009	1997-2007	1997-2009
ln(*II/TA*)						
w_l	0.371	0.359	0.1696	0.2448	0.42523	0.4526
	(0.000)***	(0.000)***	(0.000)***	(0.000)**	(0.000)***	(0.000)***
w_p	0.106	0.2426	0.29602	0.06877	0.2018	0.1421
	(0.000)***	(0.000)***	(0.000)***	(0.000)**	(0.000)***	(0.000)***
w_c	0.027	0.0395	0.1373124	0.085135	-0.00989	-0.0278
	(0.525)	(0.541)	(0.014)*	(0.000)**	(0.014)*	(0.000)***
H-statistic	0.51	0.64	0.60	0.39	0.62	0.57
Housman test	27.0	40.95	24.10	13.98	90.67	63.49
(p value)	(0.000)	(0.000)	(0.002)	(0.016)	(0.000)	(0.000)
Number of obs.	157	325	228	112	710	815
Number of groups	84	83	66	62	106	109
ln(*II*)						
w_l	-0.591	-0.504	-0.7796	0.02151	-0.552	-0.38268
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)**
w_p	0.149	0.2685	0.14863	0.00540	0.195	0.07856
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)**
w_c	0.878	0.7944	0.8686	0.00536	0.817	0.50872
	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)***	(0.000)**
H-statistic	0.44	0.56	0.54	0.03	0.46	0.21
Housman test	13.98	63.49	-59.62	108.33	184.77	15.13
(p value)	(0.016)	(0.000)	(0.000)	(0.000)	(0.000)	(0.0098)
Number of obs.	157	325	228	112	710	815
Number of groups	84	83	66	62	106	109

Source: Own analysis.
Note: Dependent variable: interest income/total assets - is sign as "II/A", interest income – is sign as "II".
*Unit factor prices: w_l – unit price of labor, w_p – unit price of funds, w_c – unit price of capital, p values in brackets, * significant at 10%; ** significant at 5%; *** significant at 1%, Hypothesis on H ≤ 0 and H = 1 was rejected at the significance level of 1%. See: Pawlowska (2010).*

Based on the values of *H statistic* (from table 2) it can be concluded that the level of competition indicates a monopolistic competition and values of *H statistic* are higher when the dependent variable is scaled by assets (see Bikker *et al.* (2006),

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[29]   In order to estimate panel analysis coefficients on non-balanced data panel, the STATA 9.2 package was used.

p. 17). Between 1999 and 2004 the level of competition in the commercial banks was higher than in the period of 1997-98. An increase in competition in the Polish banking sector was caused by Poland's accession to the EU. On one hand, the single passport law facilitated the so-called entries of new banks into Poland. On the other hand, technical solutions and a fast development of the Internet banking were important factors affecting the increase in competition in that period. In subsequent periods the degree of competition started to even out. In the period 2008-09 we can notice the slight decrease in competition caused by the financial crisis.

The results obtained by other authors for the Polish banking sector before the crisis, on the basis of data from the BankScope database with the P-R method are presented in table 3.

Table 3: Values of H statistic for the Polish banking sector

	Year	H value	The dependent variable	Number of banks
Claessens and Laeven (2004)	1994-2001	0.77	ln(*II/TA*)	40
Gelos and Roldos (2002)	1994	0.54	ln(*II/TA*)	55
Gelos and Roldos (2002)	1999	0.53	ln(*II/TA*)	55
Yildrim and Philippatoas (2007)	1993-2000	0.50	ln(*II/TA*)	53
Bikker and Spierdijk (2008)	1992	0.45	ln(*II*)	50
Bikker and Spierdijk (2008)	2004	0.03	ln(*II*)	50

Source: Gelos and Roldos (2002), p. 47, Claessens and Laeven (2004), p. 573, Yildrim and Philippatoas (2007), p. 203, Bikker and Spierdijk (2008), p. 26.

In addition, results of the analysis of competition levels performed by other authors on the basis of the H statistic indicate that the level of competition of the Polish banking sector was similar to the competition level in euro zone countries (see Claessens and Laeven (2004), p. 573).

Transformations in European banking *before the crisis* resulted from the effect of numerous and different factors (not only the introduction of the single euro currency). Those factors include: globalisation, liberalisation, deregulation, progress in IT technologies, changes in demand for banking services, progress in the European integration, implementation of the FSAP programme and the introduction of the New Capital Accord (Basel II). Therefore, it is difficult to establish unequivocally which of those factors had the strongest impact on the effectiveness and competition of financial institutions.

8.4.2. Results of Competition Measurement on the Polish Banking Sector with the Application of the Lerner Index

The calculation of the Lerner index in the Polish banking sector as well as a panel of annual data from balance sheets and profit and loss accounts of Polish banks for 1997-2009, as in the case of the P-R method.

The translogarithmic cost function (Berger and Mester (1997)) was used to measure the marginal cost:

$$
\ln TC = \beta_0 + \beta_1 \ln y + 1/2 * \beta_2 (\ln y)^2 + \sum_{j=1}^{3} \beta_j \ln W_j
$$
$$
+ \sum_{j=1}^{3} \sum_{k=1}^{3} \beta_{jk} \ln W_j \ln W_k + \sum_{j=1}^{3} \gamma_j \ln y \ln W_j + v_{it} + z_i
$$

(2)

where TC is the firm's total costs including financial costs and operating costs. As a measure of production y we use total assets, Wi – input prices are estimated in the same way as in the P-R model, see equation 1; W_1 – unit price of labour, W_2 – unit price of capital, W_3 – unit price of deposits (see also Angelini and Cetorelli (2003), de Guevara *et al.* (2007)).

The estimation of the costs function (and hence of the marginal costs) was done for all panel data. Fixed effects are also introduced, in order to capture the influence of variables specific to each firm. Finally as usual, the estimation is done under the imposition of restrictions of symmetry and of grade one homogeneity in input prices.

Next, the marginal cost MC was calculated as a derivative of the cost function against y (output here total assets):

$$
MC = \frac{TC}{y} \left(\beta_1 + \beta_2 (\ln y_{iy}) + \sum_{j=1}^{3} \gamma_j \ln W_j \right)
$$

(3)

System of equations were estimated simultaneously by employing fixed effects estimation. The Lerner index was calculated for each bank in the panel data for 1997-2009 as the quotient of the difference between the input price and marginal cost to the input price. The input price in the banking sector is assumed to be interest revenue divided by assets for each bank i in the period t (Angelini and Cetorelli (2003)); means of the Lerner indices also were computed for each year.

The main results concerning marginal cost (MC) and Lerner index for Polish banking sector for each year are displayed in table 4. Results of the measurement of the marginal cost indicate its decrease between 1997 and 2009. Between 2008-09 we can notice the slight decrease in competition. It should be noted that, in

2009 the group of commercial banks was not homogeneous. The Lerner index is inverse measure of competition, *i.e.* a greater Lerner index means lower competition.

Table 4: Results of the calculation of the Lerner index per Year for the Polish banking sector

Year	Std. Dev.	Lerner Index (mean)	Std. Dev.	MC (mean)	Number of obs.
1997	0.425254	**0.3802458**	0.009015	**0.07307695**	83
1998	0.386123	**0.3816084**	0.008732	**0.07155848**	81
1999	0.340915	**0.2866669**	0.009159	**0.06980097**	73
2000	0.306847	**0.4192944**	0.008604	**0.06887544**	72
2001	0.684271	**0.3019527**	0.008770	**0.06913474**	70
2002	0.416789	**0.0973307**	0.008439	**0.06642440**	67
2003	1.695749	**0.1360234**	0.008662	**0.06589605**	59
2004	1.596667	**0.1892985**	0.008575	**0.06461746**	59
2005	0.862366	**0.2846030**	0.008973	**0.06457389**	58
2006	0.531301	**0.2788467**	0.008505	**0.06336119**	59
2007	1.031755	**0.2591705**	0.008568	**0.06254121**	60
2008	0.479565	**0.3700726**	0.008604	**0.06174030**	64
2009	0.960399	**0.4222222**	0.022010	**0.02149720**	62

Source: Own calculations.

In order to determine the impact of the establishment of the euro zone (in 1999), and of the accession of Poland to the European Union (1 May 2004) and the financial crisis on the changes in competition, average values of the Lerner index were estimated for the following periods: 1997-98, 1999-2003, 2004-07, 2008-09. The estimated values of the Lerner index for each period are presented in table 5, p. 151.

Average values of the Lerner index demonstrate a similar trend as P-R measures. Between 1999 and 2004 the level of competition in the entire sector of commercial banks was higher than in 1997-98, as demonstrated by a decrease in the market power.

Results of the estimated Lerner index in the banking sector in Spain, Germany and the Czech Republic are presented in table 6 (p. 151). It should be noted that in countries with lower concentration measures the Lerner index indicates lower market power, *i.e.* higher competition. It should be noted that the Lerner index for the EU is 0.16 (it is mean value over 1995-2001, see. Carbó et. al. (2009), p. 120).

Table 5: Results of the calculation of the Lerner index for the Polish banking sector for 1997-1998, 1999-2003, 2004-2007, 2004-2007, 2008-2009 and 1997-2007, 2008-2009

Years	Lerner index	Std. Dev.
1997-1998	0.3809356	0.4046345
number of observations	160	
1999-2003	0.2503539	0.9259546
number of observations	256	
2004-2007	0.2534153	1.066649
number of observations	229	
2008-2009	0.2839089	0.7528025
number of observations	126	
1997-2007	0.2839089	0.8487746
number of observations	723	
1997-2009	0.3005048	0.8357595
number of observations	849	

Source: Own calculations.

Table 6: Values of the estimated Lerner index for selected banking sectors in EU countries

	Spain		Germany		Czech Republic	
Year	Lerner index	CR5 (%)	Lerner index	CR5 (%)	Lerner index	CR5 (%)
1997	0.186	45.2	0.17	16.7	–	–
1998	0.209	44.6	0.16	19.2	–	–
1999	0.228	51.9	0.17	19.0	0.3076	–
2000	0.225	54.0	0.14	20.0	0.3111	–
2001	0.236	53.0	0.12	20.0	0.2912	68.4
2002	0.249	53.0	–	20.0	0.1703	65.8
2003	–	43.1	–	21.6	0.4344	65.8
2004	–	41.9	–	22.1	0.4575	64.0
2005	–	42.0	–	21.6	0.4209	65.5

Source: ECB, de Guevara et. al. (2007) p. 285, Podpiera et. al. (2007) p. 90, Fischer and Hempell (2005) p. 24.

8.4.3. Results of Competition Measurement of the Polish Banking Sector with the Application of the Boone Method

Boone indicator in the Polish banking was estimated on the basis of the following equation:

$$\ln s_{it} = \alpha + \beta * \ln MC_{it} + \varepsilon_{it} \tag{4}$$

where: s_{it} – bank's market power defined as the market share of bank i of total banking sector assets in the period t, MC_{it} – marginal cost of bank i in the period

t, (*MC* was calculated like in case of estimation of Lerner index see equation 2 and 3), β – estimated Boone indicator.

The measure of the degree of competition is β parameter which takes on values below zero. The higher the degree of competition, the greater the absolute value of negative parameter β specifying the Boone indicator[30].

We present estimates of β for each year separately referred to annual estimates. The value of the Boone indicator calculated for the Polish banking sector between 1997 and 2004 based on equation 4 indicated the highest level of competition (see Figure 6). In 2009 we can notice the slight decrease in competition caused by the financial crisis.

The Boone method (2000) was used by Leuvensteijn *et al.* (2007) to measure the level of competition on the loan market in euro zone countries (Germany, Italy, Spain), countries from outside the euro zone (*e.g.* UK). A comparative analysis showed that the level of competition in the euro zone countries varies (the highest competition on the credit market was identified in Germany and Spain, while in France and Italy it was lower, however it is higher than in UK, see Figure 6).

Figure 6: Competition measures (Boone Indicator)
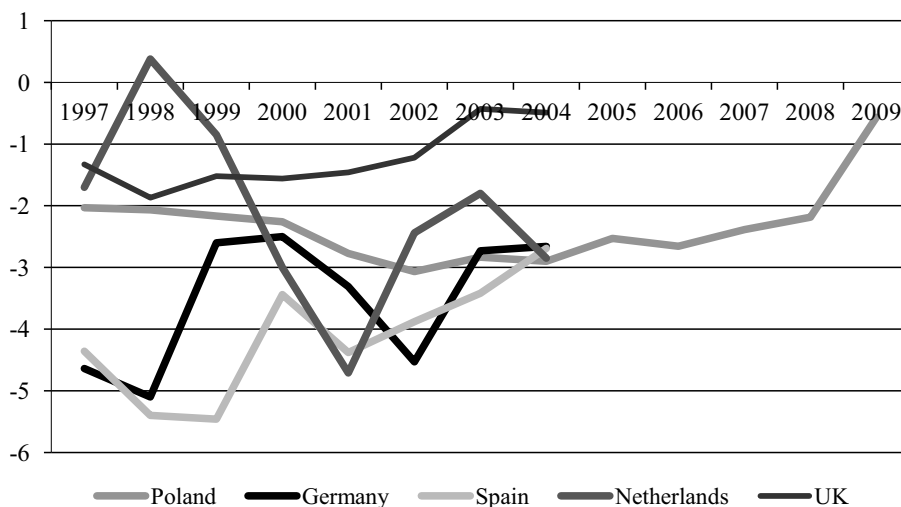
Source: Leuvensteijn et al. (2007), pp. 27-28. For Poland own analysis.

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[30]   Leuvensteijn *et al.* (2007), pp. 9-12.

Conclusions

Between 1997-2007 (before the crisis) similar to other new EU-10 countries, the Polish banking sector was undergoing intense transformation and development. The modernization of distribution channels and the implementation of new technologies have increased the availability of services and the effectiveness of banks' operations. Between 2008-09, the Polish banking system was mainly under the impact of the financial crisis. As a result of the crisis escalation a sharp increase in rates occurred on the interbank market transactions', the financing costs increased and appeared difficulties in managing current liquidity and securing the risk. In order to stabilize and improve the situation in the financial market the PFSA adopted Recommendations that were quickly implemented into banking practice, also the Polish Government took legislative activity.

The results of the empirical analysis concerning the Polish banking sector demonstrated that between 1997-2007 and 2008-09 (before and during the financial crisis) commercial banks in Poland operated in an environment of monopolistic competition. The degree of competition in the Polish banking sector *before the crisis* was close to that in the euro area banking sectors which was reflected in the values of P-R measure (H-statistic).

Results of the competition measurement with all the methods used (P-R method, Lerner index and Boone method) demonstrated a strong increase in competition between 1999-2004 caused by Poland's accession to the EU and slight decrease in competition between 2008-09 caused by the financial crisis.

Between 2008 and 2009 the Polish banking system was mainly under the impact of the financial crisis, competition measures confirm that the degree of competition in the Polish banking sector *during the crisis* decreased.

Finally, liberalisation had an impact on the competition of the financial intermediaries and also on the financial crisis. As well as, the same channels (before the crisis – increase in mergers and acquisitions and deregulation and during the crisis – increase in mergers and acquisitions as well and new regulations) which affected changes in the competition of banking sectors in the euro zone countries, affected the Polish banking sector due to the involvement of capital from the euro zone.

However the last crisis was a testimony to the failure of the three pillars of the Basel II system. The evidence points out that liberalisation increased banking crises, while strong institutional environment and adequate regulation reduces them. This suggests that coordinating regulation and competition policy is necessary (see: Vives, 2010).

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9. THE REVISITED CONCEPT OF BANK LIQUIDITY IN THE THEORY OF BANK INTERMEDIATION

Emil Ślązak

Abstract

The role of liquidity in banking sector has soared in recent years. Before the worldwide financial crisis of 2007-10, liquidity risk had been gradually considered in banking as 'forgotten risk', which was supported by boosted liquidity creation on the basis of derivatives in securitization processes. However, in recent years the spectacular illiquidity turmoil in the global banking sector has evidently demonstrated that even though the liquidity issues have enormous influence on banks stability, the concept of liquidity itself has far evaluated from its origin connected with deposits. Consequently, strong relationships between assets and liability side of the balance sheet have been largely undermined in modern financial intermediary processes. Moreover, the safety net measures organized within this traditional framework have proved to ensure limited relief to funding problems of banks in advanced economies.

The main aim of this paper is to expand the various aspects of concept of liquidity transformation in banking under the growing impact of asymmetric information in the financial market that make banks prone to highly volatile idiosyncratic liquidity shocks. Thus, this paper highlights the most significant features of the new regard to the bank liquidity by contrasting neo-classical models of funding liquidity in banks (*i.e.* a deposit pool provides liquidity insurance and determines long-term investments on the assets-side of balance sheet) and market liquidity (*i.e.* liquidity creation with off-balance sheet nature and crucial importance of market asymmetric information on banks liquidity position).

JEL Codes: G01, G02, G21

Keywords: Funding Liquidity, Market Liquidity, Asymmetric information.

9.1. Introduction

One of the pillars of neoclassical bank intermediation theory is the concept of banks perceived as 'pools of liquidity' (Diamond and Dybvig 1983; Bryant 1980). Within this framework, the primary role of banks in the economy is focused on providing the real economy agents with a set of safeguards against economic shocks. As the matter of the fact, granting long-term credits on the basis of short-term deposits brings about the liquidity mismatch in banks' balance sheets with apparent exposure to the idiosyncratic liquidity shocks.

The problem is the liquidity risk in banking activity cannot be defined in one uniform way as it is closely connected with idiosyncratic nature of diversified

bank intermediary functions in the economy both in saving and loans. Within the liquidity models, the bank may rely on either funding and market liquidity to meet its liquidity shortfall (Brunnermeier and Pedersen 2009).

Traditionally, funding liquidity refers to the liability side of the bank's balance sheet. This approach to the bank liquidity is based on funding the pool of liquid deposits or other liabilities from interbank operations and monetary policy instruments of central bank. The bank may also issue straight equity or other securities. On the other hand, within the concept of market liquidity the bank may generate cash beyond the yield accruing from assets of its balance sheet since the bank can sell easily-tradable assets such as T-bills. Over last decade the market liquidity has become closely connected with raising cash solely on the assets side of bank's balance sheet and off-balance operations in order to securitize different loan portfolios.

The recent financial crisis severely undermined the capital base of a number of banks by massive turmoil in the financial markets that has led to unprecedented high level of illiquidity but under new formula. The crisis has showed that capital and liquidity risk tend to be far much closely correlated than it previously considered. The increasing role the market liquidity risk has proved the most evident major shortcoming in detecting the roots of severe and worldwide instability of banking system only on the liability side of banks' balance (Tirole 2009). As the matter of the fact, a traditional regard of the bank liquidity risk is commonly associated with the materialization of this risk in form of a bank run. However, the sudden withdrawal of deposits was not in the core of substantial liquidity distress that has stricken the banking sector globally in recent years.

The rapid development of innovative financial instruments allowed banks to undermine traditional and strong correlation of assets and liabilities in banks' books boosting spectacularly maturity transformation on the basis of off-balance sheets operations. Consequently, the financial crisis has shown very high scale of correlation of market liquidity exposure of banks and the scale of losses putting aside the liabilities structure. This was a direct consequence of unprecedented drive to boost liquidity on the assets side of balance sheet in banks. The subsequent large exposure to financial markets caused high level of distress triggered by growing inefficiency of structured credit derivatives market.

As a result, the new paradigms of liquidity risk in banks has manifested abruptly in recent financial crisis period posing a number of challenges to the stability of the banking sector. It is worth stressing before 2007 these new paradigms of liquidity risk had not attracted much attention of regulators. Classical liquidity risk safeguards, implemented after the Great Depression, such as deposit guarantee schemes, time diversion of interbank operations and central bank role as a pool of reserve liquidity have manifested recently their limited efficiency. All these

measures have been launched in the crisis time under the neoclassical perception of bank activity based on the funding liquidity risk based on transformation liquid deposits into illiquid loans. However, within new paradigms of liquidity boosted by off-balance operations banks incurred losses much faster and in a very unprecedented way proving indirectly large inefficiencies of VaR risk management based mainly on the historical data.

The liquidity crisis in the banking sector have demonstrated a major and so far underestimated shift from the traditional role of banks as financial intermediaries with a pool of liquidity to real economy agents into investment vehicles involved in mixed cycles of intermediary procedures. The recent banks' fragility stemmed mainly from a abrupt decrease in the system-wide market liquidity where banks were performing the active roles of dealers and traders in securities and credit derivates. Accordingly, banking activity aimed at providing funding liquidity and thus creating exposure to the materialization of bank run had much less importance among triggers for last turbulences in the worldwide banking sector. Consequently, the neoclassical conceptual models of bank liquidity based on the process of issuing short-term deposits in order to finance long term productive investments have become largely obsolete in modern circumstances.

The growing importance of assets-based and off-balance market liquidity of banks has brought about severe repercussions for the financial contagion and final bailout of illiquid banks. The injection into banking sectors of massive liquid funds by central banks has not brought about the expected improvement because the 'wrong medicine' was applied to 'banks' disease'.

This paper therefore highlights the most significant features of new paradigms of liquidity concept in banking activity on the basis of experience drawn from recent financial crisis. The paper is structured as follows.

The first section deals with major characteristics and their shortcoming of neoclassical funding liquidity concept with the aim to depict the most crucial strands in the evolutionary changes of the liquidity in the theory of bank intermediation. The special emphasis has been put on demonstrating a gradual shift towards market liquidity in modern bank activity.

The second section focuses on the main features of market liquidity in banks denoting the off-balance operations such as structured asset-backed securities have only initiated the inflammation process in the banking sector. The roots of recent turbulence should be searched in growing asymmetric information that failed to be recognized until the moment of the abrupt and devastating financial crisis.

9.2.   Neoclassical Concept of Bank Liquidity

9.2.1.   Origins of Funding Liquidity

Traditionally, a maturity mismatch in the balance sheet of banks is the natural consequence of providing liquidity to real economy agents by accepting deposits on the liability side, which in turn are reinvested into illiquid loans on the assets side. This neoclassical concept of banking activity implies that banks structurally create funding liquidity and their role of financial intermediation leads to maturity transformation as liquid and thus low-yield deposits are transformed into illiquid and hence high-yield loans (Strahan 2008). Since most bank assets are illiquid as they cannot be converted into cash without incurring losses, banks need to maintain a certain degree of liquid assets implying a large prudence in regard to depositors' decisions of their funds withdrawal.

The assets-liabilities mismatch gives grounds for funding liquidity risk, which embraces the situation that a bank is unable to match cash outflows with cash inflows without affecting either daily operations or the financial standing. The cash flows lies at the core of the initial concept of liquidity in banking accepted by Joint Forum of the Basel Committee of Banking Supervision, that perceived this risk as inability of meeting efficiently both expected and unexpected current and future cash flows and collateral needs without affecting either daily operations or the financial condition (BCBS 2006). In this case the bank defaults on its obligations due to a materialization of funding liquidity risk driven by the possibility that over a specific horizon the bank will become unable to settle obligations with immediacy (Drehmann and Nikolaou 2009). However, the later concept of the liquidity in the Basel Committee of Banking Supervision has evaluated towards a market liquidity by the assumption of losses when the bank's obligations are not met at a reasonable cost (BCBS 2008).

The concept of the funding liquidity in banks is not necessarily in line with the notion of Brunnermeier and Pedersen (2009) or Borio (2000) that define funding liquidity as an ability of raising cash at short notice either via assets sales or new borrowing with securities as collateral. In my view, the core of funding liquidity should be associated with bank's obligations on the liability side of the balance sheet. Consequently, funding liquidity risk stems from a maturity transformation in the originate-to-hold banking activity. However, the above notions illustrate how far is the current notion of funding liquidity from its origin.

The substantial economic literature has been developed in the attempt to identify the main reasons for idiosyncratic bank fragility under the funding liquidity. Bryant (1980) and Dimond and Dybvig (1983) provided the coherent theory of liabilities-assets maturity transformation, where a bank run may occur if there is a scare liquid assets to meet depositor withdrawals. Depositors are identical ex-

ante and risk-averse with respect to future liquidity shocks facing idiosyncratic uncertainty about their future liquidity needs. Hence, there exist clear benefits from pooling liquid resources ex ante and invest them in the long-term technology with payments ex post contingent to depositors' demand for liquidity. It is assumed that depositors' preferences about liquidity is private information, which creates the two Nash equilibriums in the deposit market.

In the 'good' equilibrium, solely depositors who face premature instant needs for liquidity (liquidity shocks) demand an early withdrawal from a bank. Their receive more than liquidation value of the long-term assets at the expense of other depositors who wait until maturity and receive less than their full long-term return. However, banks form pools of liquidity insuring against liquidity shocks so their intermediary role constitutes a welfare-improving risk sharing. On the other hand, the privacy of information about depositors' preferences for early or late liquidity creates the risk of coordinated inducement in form of a bank run. This illustrates 'bad' equilibrium of the withdrawal game in which all depositors, despite their original preferences, influence each other to induce their premature demand for an early withdrawal from banks. As a result, the bank fails to meet their obligations and a social welfare is much lower than it could have be obtained without banks.

However, the threat of possible withdrawals in the funding liquidity concept can serve as a commitment device to discipline banks in their assets management processes (Calomiris and Kahn 1991; Diamond and Rajan 2001). Refinancing from numerous small depositors enables banks – in contrast to other financial institutions – to credibly commit not to renegotiate on the repayment obligations on deposits, because this would immediately trigger a run (See Figure 1, p. 164).

Traditional theory of funding liquidity determines that a bank is a subject to runs caused by excessive deposits withdrawals and bank defaults in result of the lack of liquid assets or new deposits from other substantive resources. Funding liquidity implies that a suspension of convertibility may prevent bank runs and the government intervention is necessary to maintain bank stability. Within funding liquidity, a deposit insurance scheme is a necessary to mitigate depositors' incentives to withdraw savings prematurely. Moreover, a deposit insurance scheme also supports the stability of the banking system reducing systemic risk exposure even though the scheme itself might not introduce bailout plans for a failing bank.

The importance of assets side of the balance sheet in maintaining bank founding liquidity could not be neglected so another strand of the banking literature, following Holmstrom and Tirole (1998), considers liquidity demand on the corporate borrowers' side rather than on depositors' side in order to present how efficiently this liquidity demand can be met through bank lines of credit. Aggregate demand shocks public liquidity should reinforce the private liquidity.

Figure 1: Main pillars of funding liquidity
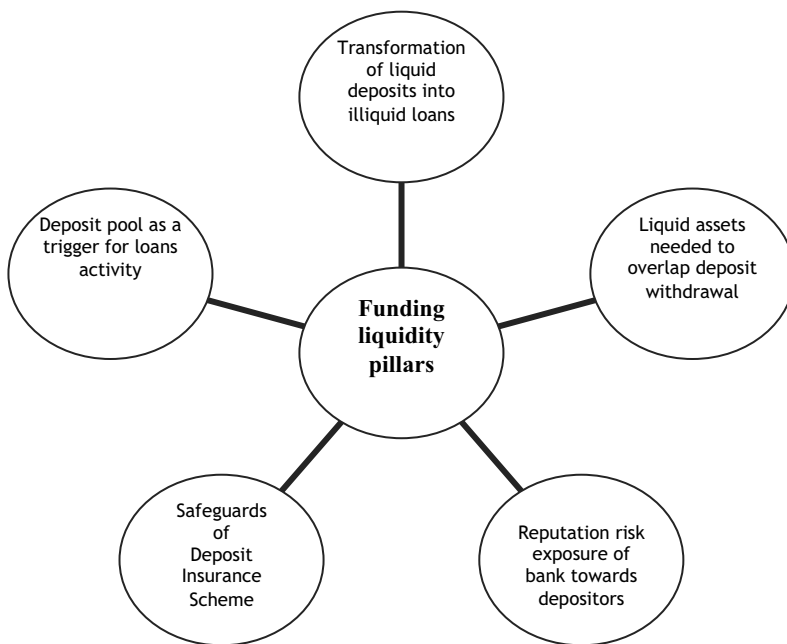
This new strand in bank liquidity literature has resulted in new findings. While Diamond and Dybvig pointed out that idiosyncratic liquidity shocks and the risk of panic runs may arise as a result of banks' attempts to insure depositors against these shocks, Allen and Gale (1998) consider aggregate business-cycle shocks and point at the need for equilibrium banking crises to achieve optimal risk-sharing between depositors. In their model aggregate shocks may trigger the need for sale of assets with no regard at their face value.

9.2.2.   Funding Liquidity and Interbank Market

In order to ensure appropriate funding liquidity, banks can benefit from borrowing and lending in the interbank market, which plays a crucial role in recycling liquidity through the banking system. Bhattacharya and Gale (1986) provide one of first models bank liquidity by extending the Diamond and Dybvig framework to allow for multiple banks, which may face different liquidity shocks. This model is one of the first signs that the funding liquidity should not be considered only from bank's liabilities prospective. They distinguished core liquidity based on the bank's own reserves and supplementary liquidity with the proceeds from bank assets sales to other investors in the market. An individual bank may meet depositor withdrawals with either inside liquidity or outside liquidity by selling

claims to long-term assets to other banks who may have excess cash reserves. An important insight of their analysis is that individual banks may free-ride on other banks' liquidity supply and choose to hold too little liquidity in equilibrium. Moreover, liquidity reserves are likely to fluctuate considerably under the impact of a set of triggers for reputation risk. Consequently, the access to interbank borrowing is not usually equal to all banks regardless their size and scope and activities in favour of large banks (Bolton, Santos, Scheinkman 2009).

Allen and Gale (2000) and Freixas, Parigi, and Rochet (2000) have analyzed models of liquidity provided through the interbank market, which can give rise to contagious liquidity crises. The main mechanism they highlight is the default on an interbank loan which depresses secondary-market prices and pushes other banks into a liquidity crisis. The common behavior of banks play a crucial role in making liquidity dry up in the interbank market. Rising liquidity risk under aggravated reputation risk causes the situation that interbank market might be no longer a source of funding liquidity. The adverse selection mechanism brings about two consequences. On the one hand, banks short of liquidity are tempted to sell illiquid assets and suffer significant liquidation costs. On the other hand, liquid banks start to hoard their liquidity aggrieving the problems of efficiency of interbank markets.

Ashcraft, McAndrews, Skeie (2008) provided empirical evidence that the rise of liquidity risk brings about a precautionary hoarding of reserves and widespread reluctance to lend, which triggers an extreme volatility of interbank market rates. Banks rationally hold excess reserves intraday and overnight as a precautionary measure to self-insure against liquidity shocks. The interbank market is prone to negative shocks to such an extent that some participants suffer too large losses to retain solvency. However, the distribution of these losses is private information, implying an adverse selection problem (Angelo and Monticini 2009). The liquidity risk in the interbank market starts to manifest when banks are loosing the confidence that they will be able to raise liquidity in the future if they need to do so in order either to fund a long term interbank loan or to roll-over a short term interbank debt. During last crisis similar findings were made in banking sectors with evident lack of assets transformation in the securitization process.

9.2.3.   Funding Liquidity and the Central Bank as a Lender of Last Resort

Under the concept of funding liquidity, the central bank acts as a lender of the last resort with a crucial role of a liquidity recycler. The central bank, by selling government-backed securities, can attract money from banks holding liquid assets and then inject it into the banking system, preventing a costly liquidation of bank assets. The problem is that recent financial crisis has manifested that the drought of liquidity in the banking sectors could not be offset by central bank. The core

of the soaring reputation risk in banking sector has not stemmed from liability-side of banking sheets. The central banks needed to develop special measures to combat these unprecedented liquidity infections in the banking sectors world-wide.

For example, in UK banking system the Special Liquidity Scheme was designed to provide that support on a one-off basis, in large size and for a long maturity. The form of the Scheme was an asset swap (effectively a collateral upgrade). In practice the commercial banks were lent for a fee nine-month Treasury bills against residential mortgage backed securities (RMBS and covered bonds). The banks could use the Treasury bills to raise liquidity in the market and these bills were also eligible in the Bank's repo operations (Fisher 2009).

Despite massive injection of liquidity into banking systems, a liquidity scare became an urgent issue not only in these banking sectors that were heavily involved into securitization process but also in these ones that have not traded in credit derivatives markets.

In course of recent financial crisis a number of financial institutions experienced sudden and massive windrawals of their deposit closely related to abrupt loss of funding liquidity. For example, in 2007 Northern Rock in the US was the first bank in 150 years to suffer a bank run after having had to approach the Bank of England for a loan facility that ended with being taken into state ownership. Other example Indy Mac Bancorp Inc. was seized by U.S. regulators after a run by depositors left the California mortgage lender short on cash. Moreover, the fourth largest US Bank, 227 year old Wachovia bank, experienced rapid loss of funding and has been taken by Wells Fargo to avoid its outright failure.

The above examples illustrate the materialization of the risk connected with funding liquidity but the origin of the huge problems stems mainly from the bank involvement in financial market operations both to acquire funds and to reinvest them. Consequently, it was not the collective behavior of the depositors searching for liquid funds placed in form of deposits that sparked the world wide strain in the banking system. As a result the cases of bank run were not numerous and public confidence towards banks maintained thanks to deposit insurance systems but lack of liquidity on the assets side of the bank balance shift moved a number of banks and financial intermediaries at the brink of collapse comparable to Great Depression period.

Furthermore, it must be emphasized that the funding liquidity is traditionally connected with the core of banking activity and in modern banking system a set of measure have been developed to combat funding liquidity (with apparent lack of such measures in terms of market liquidity), so the scope of these bank run turbulences were heavily limited. On the other hand, parallel measures have not

been set to combat the concept of illiquidity based solely on the assets management with tradable securities.

9.2.4. Funding Liquidity Risk and Narrow Banking Concept

The crucial importance of the funding liquidity and its systemic risk contagion mechanism traditionally force banks to maintain their depositors' confidence and other debtors on the liabilities side of balance sheet assuring in practice borderless possibility of withdrawing their deposits on demand or at the scheduled moment. This reliance on depositors' decisions implies that banking activity is inherently fragile in the sense of its high susceptibility to a self-fulfilling collective run of their depositors. Consequently, the funding liquidity risk has led to the concept of the narrow banking, where banks are required to cover entirely demand deposits with safe liquid assets (Wallace 1996, Kashyan, Rajan, Stein 2002)[1].

Accordingly, thanks to eliminating fractional-reserve activity banks are more likely to achieve Pareto optimum without moral hazard problems in loan activity. The sole accessible form of investments are short-term safe assets such as Treasury bills (Pierce 1991). This regard at narrow banking is in line with the origin of this concept advocated by Fisher (1935) and Fiedman (1960) who claimed that banks' idiosyncratic susceptibility to failure should be eliminated by prohibiting banks from conducting lending activity within 'full-reserve banks'. This sort of banking would eliminate systemic risk and its financial contagion, so the central bank acting as a lender of last resort would be unnecessary. Litan (1987) proposed to set up 'financial holding companies' – diversified financial conglomerates composed of banks and separately incorporated lending subsidiaries. The banks would be a transition processors accepting deposits and investing in highly liquid safe securities (T-bonds). The financial holding companies could extend lending services wholly funded by commercial papers and equity.

Contrary to initial core pillars of non-lending nature of narrow banking other economists (Bryan 1991) permit the full reserve banks to extend mortgage loans and loans to small and medium companies. The concept of narrow banks would allow the banking system to preserve liquidity without any reliance on liabilities subordinated to deposits[2].

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[1] The origins of narrow banking concept should be associated with searching for a remedy to offset devastating effects of Great Depression manifested in "Chicago plan" memorandum (1933) and "A Program for Monetary Reform" (1939). The authors of the latter claimed that "the 100% reserve system was the original system of deposit banking" and fractional-reserve banking "was considered to be a breach of trust. But what thus began as a breach of trust has now become the accepted and lawful practice. Nevertheless, the practice is incomparably more harmful today than it was centuries ago, because, with increased banking, and the increased pyramiding now practiced by banks, it results in violent fluctuations in the volume of the circulating medium and in economic activity in general". (Douglas, Hamilton, Fisher, King, Graham, Whittlesey, 1939) Source: www.economicstability.org.

[2] Thorough examination of narrow banking concept can be found in Kobayakawa and Nakamura 2000.

After the worldwide financial crisis 2007-10, the concept of narrow banking has regained its popularity. Kotlikoff (2010) proposes a limited purpose banking organized according to rules of mutual fund companies' activity with third-party custodians to hold the loans extended to public. Moreover, banks would accept checking account deposits, but they would not have exposed to a bank run as they would be required to hold 100 percent reserves (in cash and short-term Treasuries) against these deposits. Similarly, Phillips and Roselli (2010) recommend to reform financial system by limiting the role of banks to a source of supply for a safe and stable means of payment separately from the system of credit creation by financial institutions. They claim the need to transform checkable deposits as safe a means of payment as currency presently issued by central bank but without the need for the elaborate supervisory and regulatory structure required when deposit insurance and the discount window are part of the financial safety net.

Proponents of narrow banking point at the excessive ability of banks and other financial institutions to leverage not just their own money but public funds because governments routinely bail out creditors of these over-leveraged institutions. Consequently, instead of bailouts ban they postulate to change radically the whole financial intermediation by imposing ban on leverage.

The main problem with the concept of narrow banking is the right trade-off between risk-awareness and profitability of banks. A system of full-reserve banks might be safe but the core banking function of maturity transformation would become extinct. Consequently, banks would be likely to be marginalized in the markets by other financial institutions. The high probability of this scenario has been recently demonstrated by fast development of the institutions, which act as typical financial intermediaries between investors and borrowers. However, contrary to full reserve or fractional reserve banking, these institutions do not accept deposits but play a critical role in lending activity by supplying massive liquid money. Their activity has created a new paradigm of liquidity (*i.e.* market liquidity) and a new paradigm of banking (*i.e.* shadow-banking institutions).

9.3.   Towards a New Paradigm of Bank Liquidity

9.3.1.   Market Liquidity and 'Shadow Banking'

In recent decade, the growth rate of deposits as main liquidity resources has stagnated or decreased in advanced economies, which is apparently correlated with slower low ratio of public saving. As the consequence, deposits largely failed to keep up with the growth in bank assets. On the other hand, the consumption expansion geared with increasing bank loans availability, either in the durable goods and mortgage markets, put pressure on banks to search for the solutions

that would allow the breaking of constraints within traditional loan activity based on the pool of deposits.

In response to these trends, many banks have had to supplement traditional funding sources with a variety of new, but potentially less stable, financial instruments that allowed them to boost the value of loans coupled with further optimization of the credit risk allocation. It gave the birth to the dynamic growth of structured asset-backed securities (ABS) markets, especially Collateralized Debt Obligations (CDO) that form structured credit derivates.

Innovative financial instruments allowed banks to borrow heavily in the domestic and international money markets together with cutting back on their holdings of cash and securities. The impressive growth rate of extended loans was easily maintained with selling or securitizing parts of their loan portfolio. Thus, banks boosted their liquid assets on the basis of the market liquidity by re-selling these loans in the financial markets or by originating the issue of securities spitted into different risk classes from 'senior' tranches to 'junior' tranches.

Securitization has soon became a highly effective channel to convert illiquid loans into liquid securities and started to leverage the banks' profits by substituting founding liquidity with market liquidity. Accordingly, securitization increased the credit availability across all sectors of economy and at the same time reduced the sensitivity of bank loan portfolios according to availability of deposits. More controversially, securitization began to be deployed in banks as an efficient liquidity-risk management tool, which allows credit risk to be transferred from banks' books to the financial market on the basis of CDO mechanisms. The increasing role of market economy created a 'shadow banking system' consisting of off-balance-sheet investment vehicles and conduits (Brunnermeier, 2009)[3].

The pillars of stability in the classical banking system with founding liquidity risk is the deposit insurance and liquidity provision provided by the public sector. On the contrary the shadow banking system is supposed to be safe due to liquidity and credit puts provided by the private sector. This regard has underpinned the perceived risk-free, highly liquid nature of most AAA-rated assets that gave boost to the shadow banks' liabilities in form of CDO. These AAA-rated tranches are generally structured to withstand idiosyncratic risk, but by their nature are vulnerable to systematic risk and tail risk (Coval, Jurek and Stafford, 2009). Consequently, the performance of CDO exhibits higher correlation in an extreme environment than one would predict from observed behavior in a more benign environment. The growing importance of market liquidity in banking sector increased

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[3] "Shadow banking system" term is attributed to McCulley (2007), who points out that "unregulated shadow banks fund themselves with uninsured commercial paper, which may or may not be backstopped by liquidity lines from real banks. Thus, the shadow banking system is particularly vulnerable to runs – commercial paper investors refusing to re-up when their paper matures, leaving the shadow banks with a liquidity crisis – a need to tap their back-up lines of credit with real banks and/or to liquidate assets at fire sale prices."

correlations of bank and the efficiency of CDO markets lowering simultaneously traditional imperatives to maintain availability of liquid assets to meet abnormal deposit withdrawals.

Figure 2: Main pillars of market liquidity
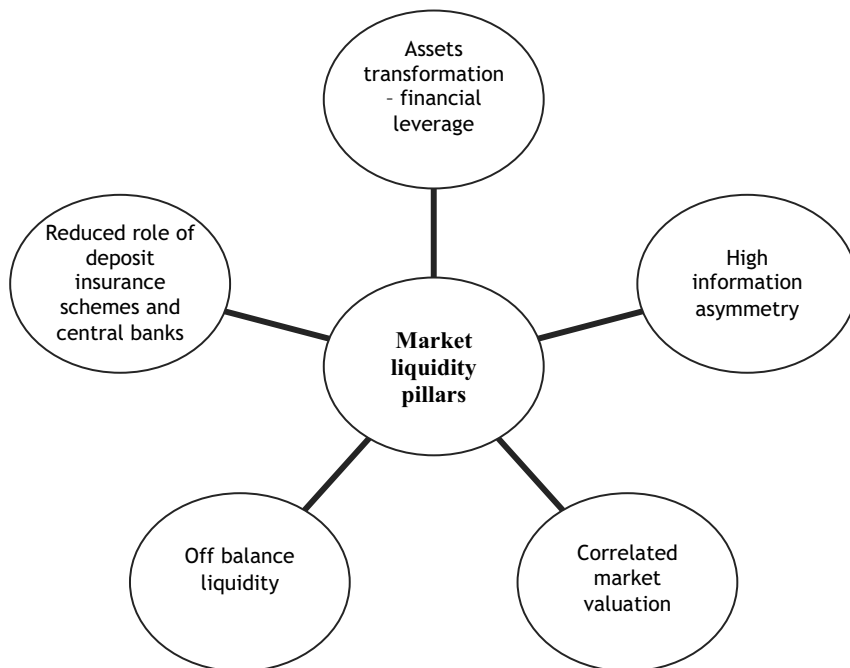
The distinguished characteristic of market liquidity is new financial intermediary model. The funding liquidity is based on holding the assets on a balance sheet financed with liquid deposits as a result of assets transformation. The market liquidity transforms the assets itself from illiquid pools of loans into liquid securities. It allows the originating bank to sell assets in the financial markets and recycle their capital to originate new loans, which can in turn be transformed and sold. Consequently, the innovative form of financial intermediary conducts maturity, credit, and more importantly liquidity transformation without access to central bank liquidity or deposits. Shadow banks comprise a long intermediation chain, which transforms credit through a wide range of secured funding techniques such as asset-backed securities, CDO and repo (Pozsar, Adrian, Ashcraft, Boesky, 2010).

The above processes are a pure consequence of the more complex systemic shift from the classical bank-dominated originate-to-hold intermediation model to

market-oriented originate-to-distribute financial market systems. Thus, market operations on the asset-side of banks' balance sheet are triggered by growing efficiency of financial markets to redistribute the capital in the economy. Empirical evidences provided by Beck and Levine (2002) suggest, that the more developed financial system is, the more important these intermediation shifts are. Securitization increases profits as banks can more easily redeploy liquid capital resources to more profitable business opportunities (Parlour and Plantin, 2007) (Schuermann, 2004).

On the other hand, securitization promotes market liquidity but simultaneously makes banks highly prone to a liquidity squeeze. On the contrary, classical banking relies primarily on retail deposits as stated Shin (2009), Brunnermeier (2009) and Ashcraft, McAndrews, Skeie (2008). The increased risk of market liquidity finds illustration in Fecht's theory (2004) that allows for a contagion mechanism where a liquidity shock at one bank propagates itself through the financial system by depressing asset prices in securities markets. In a nutshell, recent systemic changes in bank liquidity management led to increasing challenges that banks face in maintaining liquidity and profitable operations away from core banking activity.

The initial nature of recent financial crisis was major liquidity crisis, because most securities become highly correlated in downturn trend as all investors and funded institutions were forced to sell high quality assets in order to generate liquidity. This is an idiosyncratic fragility of market-based financial system, where financial institutions' balance sheets are tied together with mark-to-market leverage constraints (Pozsar, Adrian, Ashcraft, Boesky, 2010)

9.3.2.   Asymmetric Information Hazards of Market Liquidity

The contagion mechanism of market liquidity crisis was sparked by massive collapse of CDOs, which is commonly considered the origin of the worldwide financial crisis. However, it should be pointed out that these structured credit derivatives should not be considered the main reason for worldwide turbulences in banking sectors, taking into account the widespread dispersion of CDO investors and relatively small part of subprime mortgage loans in total loan portfolio (about 16 percent of all U.S. mortgage debt in 2008).

An analysis of subprime mortgages provides the evidence (Demyanyk, 2009) that within the first year of origination, approximately 10 percent of the mortgages between 2001 and 2005 were delinquent or in default, and It was the case of approximately 20 percent of the mortgages in 2006 and 2007. Moreover, the deterioration of quality of subprime mortgage loans for six consecutive years before the crisis with securitizes awareness of it (Demyanyk and Van Hemert

2007), show much more complex spectrum triggers of the market liquidity crisis than solely CDOs' collapse.

Figure 3: Global CDO Market Issuance (USD thousand)
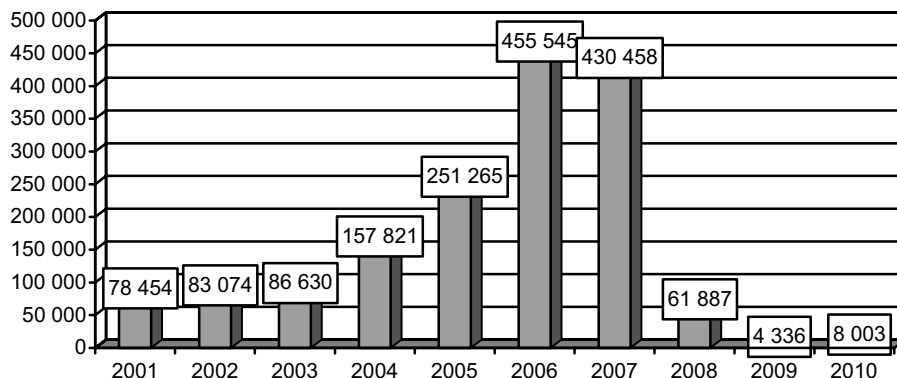
Source: SIFMA

The case of CDOs has revealed main challenges to market liquidity risk management. First of all, CDOs started to be perceived as independent category of assets despite the fact that they were issued as a credit derivates based on the specific assets with perspective cash flow scheme (Krzesniak, 2009). The example of such a regard is emergence of CDO issuances that based entirely on the equity layer trenches issued by former CDOs. Consequently, CDOs increased asymmetric information hazards in banking system as their issuers had little incentive to create high-value instruments since they anticipated smooth sells of all tranches (Keys *et al.*, 2008).

Moreover, despite their large scale, CDOs investment portfolios have not brought about the common market standards that would allow objective and comparable risk assessments like in option markets with a useful approximation of Black-Scholes equitations. On the contrary the structure of tranches within CDOs issuances was arranged in accordance with the objectives of particular group of investors. Consequently, there were no market-wide and sole mechanism of projecting future flows of tranches and risk evolution. Due to impressive diversity of CDO market, credit rating agencies failed to adequately account for set of risk and validate it respectively. The issuance flexible methodology under which the bank was able to cherry pick the loans to be put on the market deepened asymmetric information hazards in form of adverse selection.

The lack of market standardization gave grounds for another problem – limitations to regular updating of the risk exposure conveyed to the CDO investors. The historical value of referent assets portfolio was not enough even for a rough

estimation of current risk of CDOs. In time this process caused a growing information asymmetry that has finally led to the materialization of reputation risk and the abrupt value decrease. It had devastating effects on market liquidity, which stems not only from the scope of relevant information of overall quality of assets but also fluctuated market sentiments (Malherbe 2009). This aspect of asymmetric information produced a very fragile balance in the CDOs' market with its high proneness to large liquidity shifts.

Asymmetric information can be perceived also among reasons for the failure of safeguards against the risk in CDOs, *i.e.* over-collateralization and 'liquidity backstop' (Brunnermeier 2009). The lack of up-dated validation of bank assets, which served as basis for CDO issues, increased risk premiums highly beyond the haircut within over-collateralization. Moreover, the banking system still bore the liquidity risk from holding long-term assets and making short-term loans even though it does not appear on the banks' balance sheets.

Market liquidity affects considerably the fair value of traded securities. Consequently, market prices deviate widely from 'fundamental' values of assets, putting at stake the regulatory capital of banks. In financial markets with large information asymmetry the fair value accounting can become inaccurate generating high fluctuations of price. The effectiveness of fair value is closely connected with level of liquidity of the market and corresponding ability to accurately set collectively value of marketable securities. Adjusting the value of CDOs to their market value was difficult due to lack of market standardization and tailored-made procedures of issue.

Banks were dealing with fair value accounting problem using as benchmark prices of new CDO issues or implanting internal valuation methods. The first method turned out to be greatly illusive as sharply fluctuating structure of new portfolio failed to supply banks with appropriate benchmarks. The second method also failed as the internal valuations were difficult to validate and in fact they merely mask the acute problems. As the consequence, the fair value accounting led to write-offs not only actual losses but also potential ones undermining the credibility of the market. Materialization of reputation risk has led to the spiral of self-aggregative financial distress due to lack of natural market stabilizers such as speculative purchases. Many banks and other financial institutions had to write off significant losses as a result of marking-down CDO's prices to market value, which aggravated market illiquidity creating the stigma of collaterals.

Limited market liquidity triggers large value volatility especially in terms of downturn trend. In a situation of rising information asymmetry the materialization of reputation risk is initiated by a mere concern of wider risk exposition and market demand for securities collapses. In the illiquid markets banks are exposed

to abrupt dry-ups. To make matters worse, the automatic transaction systems based on stop-losses undermined the ability of investment companies to maintain further such assets in their portfolio. Highly correlated liquidity of CDOs resulted in the chain reaction without stabilizing speculation associated with other financial markets.

Figure 4: Pitfalls of market liquidity in banking sector
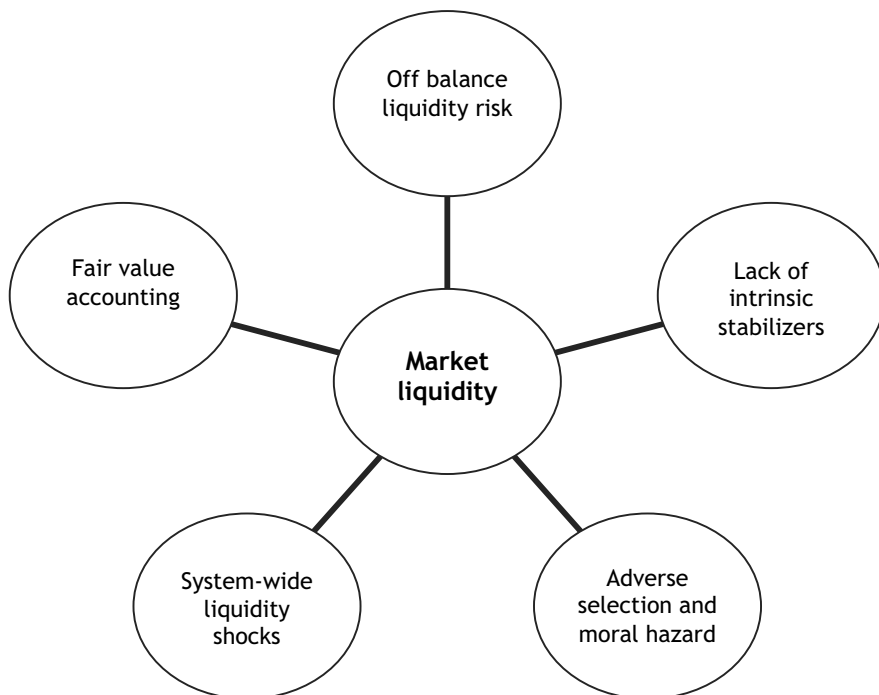
Source: Own analysis

Market liquidity favors the short-term financing to test the confidence in bank's ability to perform market operations (Stein 2005). On the other hand, most mortgages have maturities measured in long term, which creates an increase in the maturity mismatch on the balance sheet of banks. This mismatch is amplified by the moves towards financing balance sheets with short-term repurchase agreements (repos). The fraction of total bank assets financed by overnight repos roughly doubled from 2000 to 2007 (Brunnermeier, 2009). Consequently, market liquidity led to greater banks reliance on short term financing requiring to roll over a large part of their funding even on a daily basis. The tremendous increase in the market liquidity has brought about wider maturity mismatches based on the banks reliance on short-term market liabilities (Tirole 2009).

9.4.   Concluding Remarks

Despite the fact that classical model of funding liquidity in banking has been largely reshaped by new financial intermediation with market liquidity imperatives, it has little consequences for institutional framework so far. The mechanisms of intrinsic stabilizers in banking sector are still organized mainly around the concept of transformation of liquid deposits into illiquid assets together with a predominate role of central banks and deposit insurance schemes as pillars of security net. The last worldwide financial crisis has made it evident that the classical role of banking intermediary has undergone profound changes in advanced economies.

The most apparent proof of this transformation is the limited importance of classical bank runs and system-wide liquidity crisis geared by massive trade of assets based securities such as CDOs. The fragility of liquidity stability in banking addresses the important weaknesses of classical theory of banks as liquidity pools. Undermined liaisons between banking assets and deposits create new challenges to the theory of banking intermediary functions. The contradictory solutions to the above phenomena such as the concept of narrow banking or shadow banking system create the scope of fruitful progress in understanding liquidity shortages both at empirical and academic levels of knowledge.

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10. AN ALTERNATIVE WAY OF CALCULATING RISK-BASED DEPOSIT INSURANCE PREMIUMS

Susanna Walter and Matthias Schaller

Abstract

The pricing of deposit insurance premiums traditionally uses expected loss approaches for the calculation of premium charges. Merton (1977) opened up a second branch using option pricing methods for the evaluation of the risk a bank poses to the deposit insurance scheme. We present an innovative methodology to allocate deposit insurance premiums among financial institutions that uses elements of both approaches: We use standard key figures on capitalization and liquidity from expected loss models on deposit insurance pricing and integrate these figures into a stochastic process based on the Merton framework. Hence, we are able to build on the advantages of a multi-indicator model while still using the dynamic information of option pricing models. Our empirical validation of the model suggests that our pricing algorithm is in fact able to discriminate between the riskiness of banks and it is also highly sensitive to worsening conditions of a financial institution.

Keywords: Deposit Insurance, Risk-based premium, Covered Deposits, Expected loss, Option Pricing, Basel 3

JEL Code: G1, G18, G21, G22, G28, G30, G32, G33.

10.1. Introduction

The recent financial crisis once again proved that the financial industry is decisively different from other industries. One of the major differences is that the collapse of a competitor does not strengthen the position of everybody else in the market but can rather lead to a domino effect that ultimately drags down the whole financial system and, undoubtedly then, the economy. Even though most governments were ultimately forced to take steps in mitigating the turmoil, the financial safety nets of most countries proved to be quite effective in protecting the financial institutions. This is especially true for deposit insurance as one of the core elements of a financial safety net. While the financial system as a whole was very fragile during the crisis, the deposit insurance schemes at least managed to prevent bank-runs throughout most of the crisis.

Deposit Insurance schemes (in short: DIS), however, are no free lunch. Traditional moral hazard theory argues that deposit insurance creates a strong incentive for the management of banks to choose exceptionally high leverage and for the customers of banks to loosen their monitoring activities. As with other types of insur-

ance, moral hazard is most important when the premium of deposit insurance does not properly reflect the effective underlying risk associated with the activities of the banks. Accordingly, moral hazard could be partially mitigated by introducing risk-adjusted premiums to deposit insurance schemes. This, however, proofs to be a very challenging subject as it is all but clear, what the actual bank risk is and how it should be measured.

Current academic as well as practical literature shows that there is still no fair and pragmatic calculation method according to the broad requirements for the calculation of risk-based premiums in deposit insurance as specified by JRC (2009). However, the need for such a system is going to be explicitly anchored in the revision draft of the Directive 94/19/EC and the complementary Directive 2009/14/EC (2009) (see JRC 2010b). As a typical feature of a self-regulatory framework, the original Directives (as well as relating recommendations and principles such as FSF 2001 and IADI 2009) and the revision endeavours stipulate that the costs of funding deposit insurance systems should be borne by the appropriate members (*i.e.* the credit institutions). However, the regulations give no details on how such risk-based premiums should be determined in order to augment an ex-ante deposit insurance fund (DIF).

The aim of our paper is therefore to contribute to this discourse by introducing a Merton-based, risk-adjusted calculation of deposit insurance premiums. Our approach combines the advantages of expected loss pricing and option pricing theory in an innovative framework. It relies on established key figures from expected loss pricing for the assessment of a bank's riskiness, but at the same time, incorporates the time-variant information included in option-pricing theory.

The remainder of this article is organized as follows: The next section provides an overview of the relevant previous research in the area of the risk-based pricing of deposit insurance premiums. The third section elaborates on our theoretical modelling framework. In the fourth and fifth section, we test our model based on data of the US banking sector for the years 2002 to 2009. The final section discusses and concludes the paper.

10.2. Literature Review

There is a strong consensus in research as well as in practice that risk-based premiums for deposit insurance schemes are – mainly in combination with ex-ante funding – preferable to flat premium pricing. The reason is that risk-adjusted premiums for deposit insurance are most capable of preventing moral hazardous behaviour since it penalizes riskier banks (Keeley 1990, Marshall and Prescott 2001, Bartholdy *et al.* 2003, Demirguç-Kunt and Huizinga 2004, Demirguç-Kunt

et al. 2007). Additionally, as Pennacchi (2005) shows, risk-based deposit insurance premiums generate smaller pro-cyclical effects than risk-based capital requirements. Thus, the pro-cyclical impact of Basel II can be reduced by strengthening risk-based deposit insurance premiums.

There are two relevant streams for the calculation of deposit insurance, expected loss pricing and Merton-type approaches. Expected loss pricing, originally stemming from credit risk management, is centred on a bank's expected probability of default (PD). This PD can be estimated using fundamental data (*i.e.* capitalization ratios) or market data (*i.e.* credit spreads). Since market data is not available for the large part of most banking sectors, risk-adjusted deposit insurance premiums that are currently in place rely on expected loss pricing based on fundamental data. A comprehensive overview on the risk-based methods that are currently adopted in five countries in the EU27 (Germany, France, Portugal, Italy, Finland and Sweden) as well as on the method currently in place in the US are summarized in JRC (2008). The major drawback of expected loss pricing is its strong focus on point-in-time assessment of PDs. Hence, expected loss pricing mostly disregards any dynamic behaviour in the development of relevant key figures.

Merton-type approaches for the calculation of deposit insurance premiums are able to remedy this shortfall of expected loss pricing. These approaches employ elements of option pricing theory based on Black and Scholes (1973). The original Merton framework (1977) uses these principles in order to estimate the probability of default of companies in a time-continuous setting. The default process of a company is driven by the value of assets and the value of liabilities. The resulting default probability is therefore explicitly linked not only to current values of the firm's assets, but also to its variability. One major drawback of Merton's (1977) original framework is that it uses the asset value and volatility of a bank's assets in order to derive its riskiness. Both parameter are unobservable and therefore prevent the model from practical adoption. Marcus and Shaked (1984) and Ronn and Verma (1986) were the first to address this issue using the observable market value of equity and its volatility of listed banks. Additionally, there are several papers proposing methods on how to estimate the effective and market-based equity value as well as its volatility (Kuester and O'Brien 1991, Barth *et al.* 1992, Cooperstein *et al.* 1995, Duffie *et al.* 2003, Falkenheim and Pennacchi 2003, Eom *et al.* 2004).

We contribute to both streams of literature on risk-adjusted deposit insurance premiums: Regarding the Merton approach, our model circumvents to problem of estimating equity values by using data that is readily available for most banks in all developed countries. We then use key figures derived from expected loss pricing for the estimation of probabilities of default of banks and incorporate these figures into the time-continuous setting of the Merton-type approaches.

10.3. Methodology

As a necessary requirement of our approach, we assume that the total fund payments per period are exogenously pre-specified. This is in line with most approaches currently in use (EBF 2010, JRC 2010) and also most likely to pass political decision processes. This reflects a DIS where the target rate of total fund size to total insured deposits is pre-defined as well as the period during which this target rate should be reached (accumulation period). This assumption of an exogenously determined fund sizes considerably facilitates the calculation of premium payments since it reduces the question of the absolute riskiness of the banks to a question of the relative riskiness of a bank compared to the other banks in the sector. Additionally, any systemic risk components in the banking industry might be neglected under the assumption that the systemic risk is distributed homogenously across the financial institutions. Assuming exogenously fixed total premium payments and abstracting from systemic risk components, the only remaining relevant factors for the calculation of deposit insurance premiums are a contribution base and a factor reflecting the risk profile of a bank (JRC 2008, JRC 2009, Bernet and Walter 2009).

Our model uses several steps for the calculation of a bank's contribution to the overall fund inflows of a certain period: In the first step, it is necessary to identify the set of p relevant variables X that are useful for predicting stability of bank i. Depending on the focus of the setup for the DIS, the variables could either be derived from credit rating analysis, research on bank stability, or key figures of regulatory schemes. It is worthwhile noting that the set of variables could consist of any number of variables. In the second step, these variables are included in a logistic regression as independent variables, whereas bank default is the dependent variable. The resulting propensity score of bank i for period t is calculated using the following equation:

$$PS_{i,t} = \frac{\exp(\beta_0 + \beta_1 \cdot X_1 + \beta_2 \cdot X_2 + \ldots + \beta_p \cdot X_p)}{1 + \exp(\beta_0 + \beta_1 \cdot X_1 + \beta_2 \cdot X_2 + \ldots + \beta_p \cdot X_p)}$$

PS : Propensity Score
i : Bank
t : Period
β : Coefficient
X : Independent Variable
p : Number of Covariates

The usage of logistic regression does, of course, restrict the model to banking systems with a sufficient number of bank failures in order to calibrate the model. However, if this requirement is met, the calculation of propensity scores automat-

ically includes statistically optimized weightings to each of the variables based on the coefficient estimated by the logistic regression. The calculated propensity score $PS_{i,t}$ reflects a value that corresponds to the riskiness of bank i in period t, based on the historical information of failed versus non-failed banks in the respective banking sector. In order to come up with a time series of propensity scores, this procedure has to be repeated for each bank and each period. The resulting time series' of propensity scores constitutes a vector of a single variable that incorporates the relevant and available information on each particular bank.

Now, taking the stochastic process of bank i,

$$PS_i = [PS_{i,1} \quad \dots \quad PS_{i,T}],$$

PS : Propensity Score
i : Bank
t : Period
it is possible to calculate the corresponding mean μ_i and standard deviation σ_i of propensity scores. Assuming log-normally distributed values of propensity scores, it is then possible to specify the bank-specific stochastic process associated with the propensity scores as:

$$dPS_{i,t} = \mu_i dt + \sigma_i dW_t$$

PS : Propensity Score
i : Bank
t : Period
W : Standard Wiener Process
μ : Mean
σ : Standard Deviation

Staying with the Merton terminology, the time-constant value of liabilities is set to unity. Since the range of values of the propensity scores and the survival propensity is [0;1] this means that the put option associated with the stochastic process is always at- or in-the-money. From an economic perspective, this might be interpreted as the immanent risk of default, every, even the safest, financial institution poses to the banking system. Following Merton (1977), the fair value of the put option associated with the process can be written as:

$$P(PS_{i,T}) = \theta(h_2) - \frac{1}{(PS_{i,T}+1)} \cdot \theta(h_1)$$

where

$$h_1 = \frac{\left\{\log(PS_{i,T}+1) - \dfrac{\sigma_i^2 \cdot T}{2}\right\}}{\sigma_i\sqrt{T}}$$

$$h_2 = h_1 + \sigma_i\sqrt{T}$$

P : Put Option Value
PS : Propensity Score
T : Observation Period
σ : Standard Deviation

Whereas the Merton model uses the deposit-to-asset value ratio, our model uses the propensity score of the banks increased by one. The constant addition of one is necessary as the average propensity scores are very low, *i.e.* closer to zero than to one. The original Merton framework works with deposit-to-asset values in the range close to one and accordingly, the model has the best discriminatory power in this area. By adding one to the propensity scores, we are able to make better use of the discriminatory power, while the basic concept of the pricing algorithm remains unchanged.

The put value calculated for each bank reflects the risk component. In the next step, this risk component is multiplied with the bank-specific contribution base. In the case of deposit insurance, the contribution base are the covered deposits $CD_{i,t}$ of the bank which reflect the effective exposure to a DIF. In order to come up with the final contribution of each financial institution, these risk components – weighted by the contribution base – need to be transformed into values relative to the overall payment. The relative risk contribution, multiplied with the total payments per period, constitute the deposit insurance premium per bank in the respective period $DIP_{i,T}$:

$$DIP_{i,T} = \frac{P_{i,T} \cdot CD_{i,T}}{\displaystyle\sum_{i=1}^{1} P_{i,T} \cdot CD_{i,T}} \cdot PP_t$$

DIP : Deposit Insurance Premium
P : Put Option Value
ID : Covered Deposits
PP : Total Premium Payments
i : Bank
t : Period

This model requires a set of assumptions: Regarding assumptions related to technical and structural aspects of premiums, we incorporate no regulatory forbearance or other bailout assistance options (such as M&A). Furthermore, we assume compulsory membership of banks as recommended by most academic literature (Garcia 1999, Demirgüç-Kunt *et al.* 2003) as well as (self-) regulatory framework components and underlying principles (Directive 94/19/EC 1994, JRC 2010, and IADI 2009). This compulsory membership prevents adverse selection problems otherwise associated to deposit insurance schemes. We further assume that all banks actually pay their risk-based premiums (*e.g.* the government has the power to oblige banks which accept domestic covered deposits to pay for their risk-based premiums). Finally, we abstract from any auditing or fund-related overhead costs and abstract from interest income of financial investments of accumulated fund assets.

In the following section, we want to present one potential alteration to the pricing model that uses an Ornstein-Uhlenbeck process as underlying stochastic process:

$$dPS_{i,t} = \omega(\mu_i - PS_{i,t})dt + \sigma_i dW_t$$

PS : Propensity Score
i : Bank
t : Period
W : Standard Wiener Process
μ : Mean
σ : Standard Deviation
ω : Mean-Reversion Factor

This process is able to capture mean-reverting behaviour in the propensity scores of the banks. The, now time-variant drift of the process is calculated as the difference of the long-run average of propensity scores and the current propensity score, scaled by a mean-reversion factor between zero (no mean-reversion) and one (complete mean-reversion). If a significant part of the predictor variables in the logistic regression exhibit a mean-reverting behaviour, this characteristic should also be incorporated to the process of propensity scores.

To illustrate the adequacy of mean-reversion, we assume a model that includes the capitalization of banks as predictor of bank riskiness. The basic Gaussian stochastic process is designed to meet the development of stock prices. Abstracting from a constant drift, the best estimator of the next value is the current value. This, however, might not be reasonable for capitalization levels of banks. To a great extent, the general level of capitalization of a bank is a strategic decision of the bank's management that trades-off aspects of profitability and bank stability. Only subsequent to regime changes in the regulatory or competitive environment, which we do not incorporate in our model, capitalization ratios should evolve to

new stationary levels. Accordingly, the best estimator for a capitalization might not be the current value, but a value somewhere between the current value and the target capitalization of the bank. This results in a mean-reverting process, described by the Ornstein-Uhlenbeck characterization. The introduction of the mean-reverting process, however, distinctively complicates the calculation of the put values and the respective premium payments.

10.4. Data Sample

In this section, we test our model using data of the US banking sector. We require information on the contribution base of each bank (*i.e.* the size component), the risk factors used to derive the propensity scores and assumptions regarding the total premium payments per period.

As contribution base, we choose the covered deposits of each bank. Covered deposits include all deposits of banks that are insured by deposit insurance. As the exposure of the DIF is restricted to these deposits, covered deposits effectively mirror the maximum exposure a bank imposes on the DIF. In the case of the USA, covered deposits are protected or insured deposits repayable by the guarantee scheme under the appropriate national law. In the USA, all traditional types of bank accounts – checking, savings, trust, certificates of deposit (CDs), money market deposit accounts and IRA retirement accounts – are insured by the Federal Deposit Insurance Corporation (FDIC) if the respective financial institution is a member of the FDIC. The insurance is limited at an amount of $250,000 per customer.

It is important to note that the empirical analysis is only one illustration of the potential applications of the calculation methodology. There is a wide variety of factors that might be included in the determination of bank risk. The actual choice of variables might also be influenced by several external factors, *e.g.* political, academic, or the availability of data. In this example, we focus on variables derived from the Basel III framework. Two major pillars of the current Basel framework are capitalization and liquidity. Accordingly, we incorporate one variable on each of these two dimensions of bank stability. With regard to capitalization, we choose tier 1 ratios as indicator. This variable is – designed as minimum requirement – also the variable that is included into the Basel framework. In accordance with current regulatory efforts to strengthen liquidity requirements of banks, we also include the liquidity cushion of banks into our analysis. Basel III proposes two different key figures on liquidity: The liquidity coverage ratio and the net stable funding ratio. The data required for the calculation of any of the two figures, however, is not yet available. Hence, we restrain our analysis to the cash ratio. The cash ratio indicates to what extent an institution is able to meet its short-termed obligations using its most liquid assets. In the beginning of

the empirical analysis, we will provide evidence on the separation power of both variables with regard to bank default.

Concerning the total premium payments per year, there are two relevant factors: the designated reserve ratio and the accumulation period. The reserve ratio (or relative fund size) of a deposit insurer is the ratio of fund reserves to total covered deposits. In general, it needs to be "adequate to at least cover the potential losses of the insurer under normal circumstances" (IADI 2009). The Dodd-Frank Act establishes a maximum designated reserve ratio for the USA of 1.5% of estimated covered deposits (FDIC 2011). As a comparison, in the EU27, the practically adopted target ratio relative to covered deposits is at a median of 1.75%, excluding Romania as an outlier with a target coverage of 10% (Hoelscher *et al.* 2006). In accordance to the US and European specifications we fix our relevant coverage ratio at 1.5% of covered deposits.

Regarding the accumulation period of the target fund size, recommendations range from 5 to 17 years (JRC 2008, EBF 2010, FDIC 2011). For our analysis, we choose a time frame of 10 years or a respective 40 quarters. This period reflects a hypothetical example of a newly established ex-ante financed deposit insurance fund in the US banking sector. For our calculations, we need to detect the quarterly amount of premium inflows that reaches the target size of 1.5% of the CD within the period of 10 years. To keep the calculations simple, we abstract from any compounding effects in real terms. This results in quarterly target premium payments of 0.0375% of covered deposits across all banks, assuming a stable economic environment with a negligible amount of bank failures.

Our empirical analysis is based on quarterly balance sheet as well as income statement data of all US-American banks and thrift institutions registered with and reported to the Federal Deposit Insurance Corporation (FDIC) for the time period 01/01/2001 – 6/30/2010. For financial years before 2001 the FDIC does not report quarterly figures. Therefore, our data sample is limited to a total of 38 periods. Over the investigated time period, a total of 10,966 different financial institutions reported to the FDIC on a quarterly basis (see Table I, p. 188). 329 of these institutions either failed in the course of the sample period or needed an assistance transaction to be able to continue business. In the following, this subsample is referred to as failed banks (F).

The second subsample amounts to 10,637 non-failed banks (NF), which reported at least once in the course of the observation period to the FDIC and neither defaulted nor required any assistance transactions. For each year we display the number of reports available for the respective subsample (*e.g.* in 2001 there were 270 reports available of banks that eventually defaulted in the subsequent years). In order to avoid a selection bias we also include all quarterly reports submitted by banks that were acquired by a competitor in the course of the observation

Table I: Summary Statistics on FDIC Data on Bank Statistics

Year	Reports Available NF	Reports Available F	Bank Defaults	Employees (Median) NF	Employees (Median) F	Employees (Mean) NF	Employees (Mean) F	Balance Sheet Total* (Median) NF	Balance Sheet Total* (Median) F	Balance Sheet Total* (Mean) NF	Balance Sheet Total* (Mean) F
2001	9,343	270	9	32	41	173	1,306	92.5	122.4	679.3	5,654.1
2002	9,086	269	6	33	46	181	1,400	99.1	147.6	744.0	6,247.1
2003	8,906	276	5	34	49	187	1,392	105.2	171.1	809.7	6,768.8
2004	8,693	284	1	34	55	193	1,500	110.6	214.4	904.1	7,927.1
2005	8,539	296	-	35	61	196	1,651	117.2	251.0	957.6	9,152.9
2006	8,378	305	1	36	65	199	1,782	122.8	304.1	1,017.4	10,995.0
2007	8,234	305	4	36	70	203	1,802	128.8	337.0	1,122.3	12,486.9
2008	8,035	274	57	37	61	210	1,682	138.0	316.1	1,288.8	12,676.1
2009	7,883	137	160	37	50	210	2,747	149.1	296.1	1,280.4	20,273.5
H1 – 2010	7,847	32	86	37	57	207	4,439	151.8	331.1	1,300.0	33,161.7
Total	**10,637**	**329**	**329**	**35**	**55**	**195**	**1,746**	**119.0**	**227.4**	**998.0**	**10,655.7**

*in million USD

period. Comparability and correctness of the data points reported by the banks is ensured by the standardized FDIC data collection process. This holds in particular for the classification of individual positions. Accordingly, the definition of our tier 1 capital matches with the FDIC and includes common equity plus noncumulative perpetual preferred stock plus minority interests in consolidated subsidiaries less goodwill and other ineligible intangible assets. The amount of eligible intangibles, including mortgage servicing rights in core capital is limited in accordance with supervisory capital regulations. By limiting the data sample to FDIC-registered banks we ensure that all banks are obliged to a comparable regulation framework.

In the first year, the sample of non-failing institutions contains 9,343 reports. This number continuously decreases to 7,847 reports filed at the end of 06/2010. The decrease of filed reports is a result of industry consolidation through mergers and acquisitions. The pattern behind the number of reports available for failed institutions is determined by the recent financial crisis. Throughout the period before the current crisis, the number of reports filed every year slightly increased from 270 in 2001 to 305 in the period just before the financial crisis started in 2007. With an increasing number of banks defaulting from the beginning of 2007, this figure starts to decrease until the end of mid-2010 (32). In the last two years, the failed sample decreases dramatically as the majority of the failures happened within these two years. Generally, the failed sample contains larger institutions in terms of workforce and balance sheet total than the sample of non-failing institutions. The median of failing banks employs 55 full time equivalents (FTE) whereas the median of non-failing banks employs only 35 FTEs. The respective mean values are by far larger, which is due to the largest banks in both samples that skew mean values to higher levels. Similar relations are also reflected in the balance sheet total as a second proxy for bank size.

In the next section, we want to elaborate on the applicability of the data for our pricing methodology. We proceed in three steps: In the first section, we show the separation power of tier 1 ratios and cash ratios with regard to bank default. In the second section, we test the lognormal distribution of the respective underlying time series'. In the third section, we test for mean-reverting behaviour as one of the potential extensions to our model.

In Figure 1 and Figure 2 (p. 190) systematic changes in the tier 1 and liquidty levels. There are three interesting findings in these developments: First, for the tier 1 ratios, the non-failing banks show relatively stable values throughout the whole observation period. This suggests that changes in industry dynamics, if so, only play a minor role in the changes of tier 1 ratios. Second, the tier 1 ratios of the failing sample are distinctively lower over the whole observation period than for their surviving peers. Third, tier 1 ratios drop in the direct advent of default resulting in a median value directly before default of only 2.2%.

Figure 1: Development of Tier 1 Ratios towards Default
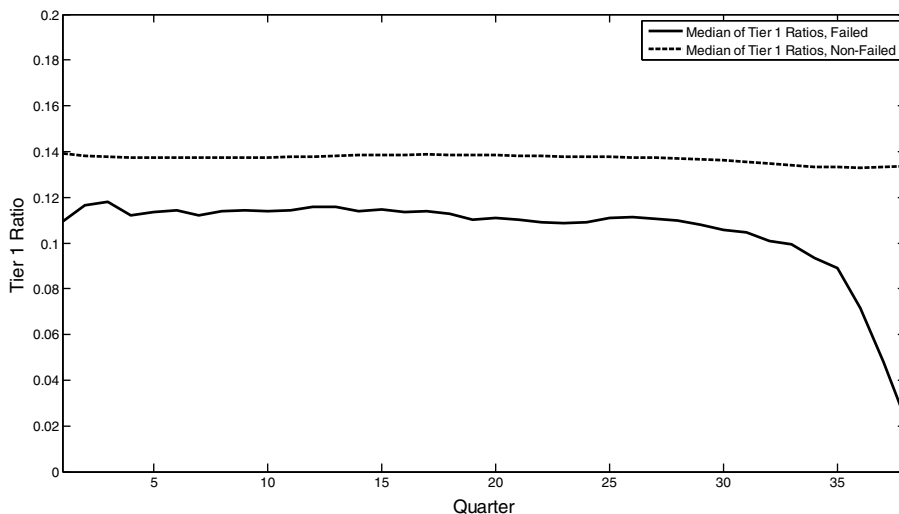
Figure 2: Development of Liquidity Ratios towards Default
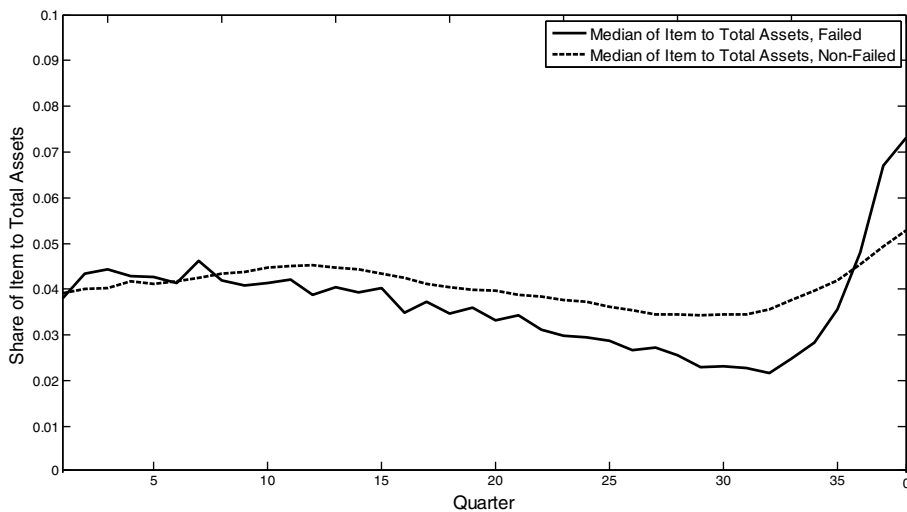
For the liquidity ratio the picture is somewhat different: First, there is some variance in the control groups, which suggests that, especially during the recent financial crisis, there were distinctive alterations in the liquidity cushion in the whole banking industry. Second, we find that failing banks have on average a lower liquidity cushion throughout most of the observation period. Third, in the direct advent of default, which corresponds to the period of the financial crisis for most of the bank failures, there is clear evidence for liquidity hording. To account for

this effect, we exclude the last year before default in our analysis on the discriminatory power of the liquditiy ratio.

We deepen this analysis by looking at the density distribution of both, the tier 1 ratio and the liquidity ratio. Figure 3 and Figure 4 show the results for the two subgroups of failing and non-failing banks. The results match with the findings of the previous analysis and show that both variables appear to have high discriminatory power with regard to bank default. Most importantly, this does not only account for the direct advent of default but also for the medium- to long-term.

Figure 3: Tier 1 Ratios at Default vs. Control Group
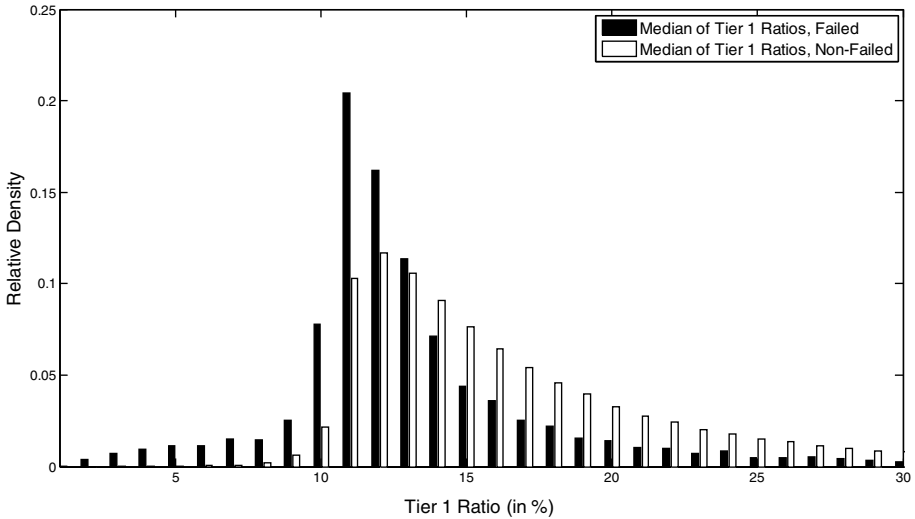
Figure 4: Liquidity Ratios at Default vs. Control Group
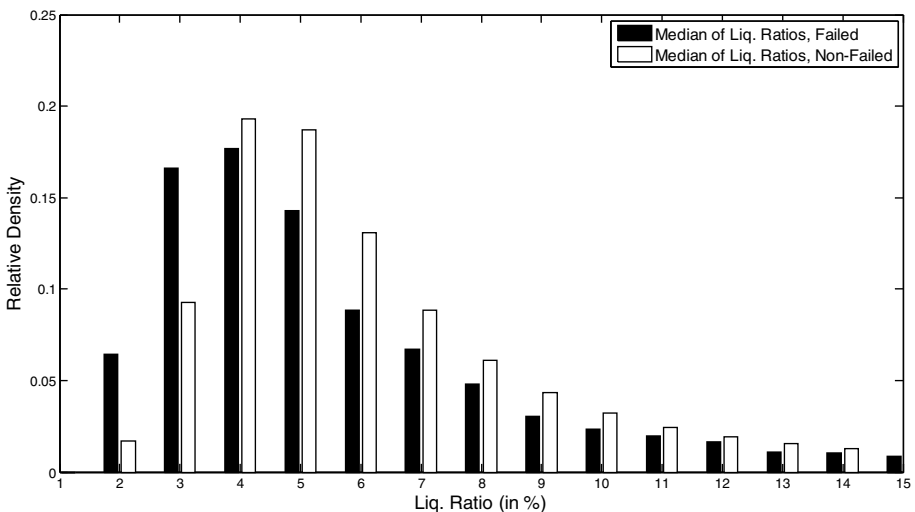
In order to apply most of the approaches based on Black and Scholes, a log-normal distribution of the underlying values is required. We examine the log-normal distribution of propensity scores using the Lilliefors specification test (Lilliefors 1967). It uses the null hypothesis that the sample stems from a distribution in the normal family. Our approach requires a separate simulation for every financial institution. Hence, log-normal distribution is a necessary requirement for the data on every bank that is included in the simulation.

Using a significance level of 1%, we find that overall 70.1% of the samples do not require rejecting the null hypothesis of log-normally distributed values. Even though this value suggests that there is indeed a significant share of financial institutions whose propensity scores do not exhibit a log-normal distribution, there is a large degree of heterogeneity in the results. When we control for outlier and size effects, the results look quite different: An exclusion of changes in propensity scores larger than +/-30% increases the share of non-rejected null hypotheses to a value of 88.6%. If we control for differences in the size of banks by dividing the sample into ten cohorts of increasing balance sheet size, the corresponding results are depicted in Figure 5. The share of non-rejected null hypotheses and, therefore, supposedly log-normally distributed values increases with a decrease in balance sheet size. For the sample with the smallest banks, this ratio reaches 97.7%. For the largest sample, the value does not exceed 75.1%.

Figure 5: Share of log-normally Distributed Propensity Scores over Size
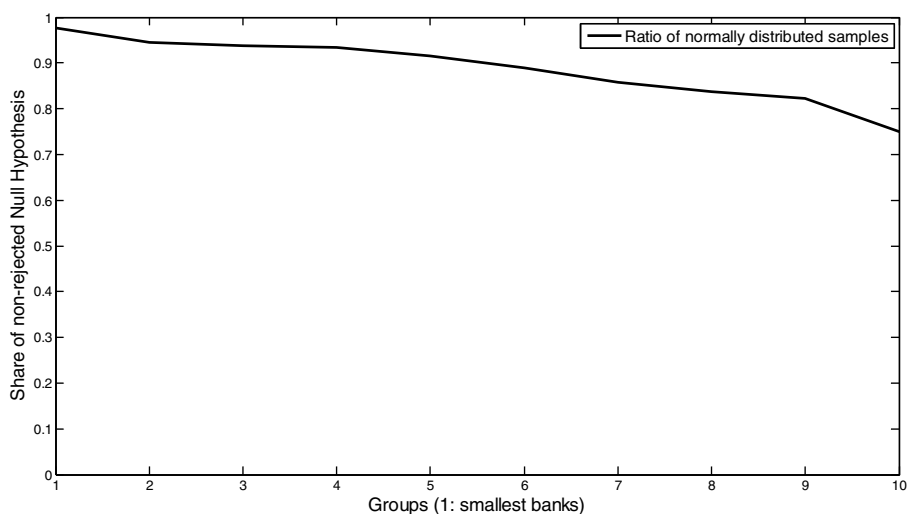
As with most applications of the option pricing approaches, the tests of the log-normal properties of the underlying data deliver mixed results. The model assumptions are most accurately met for smaller banks and hence the pricing

results are most accurate for this subsample. Our analysis suggests that most rejections of the lognormal distribution stem from the disproportionate share of outlier values. Overall, we are not able to reject or confirm the assumption of log-normally distributed propensity scores. However, since the findings rather suggest not rejecting the null hypothesis of lognormal distribution, we proceed with the full data sample for the empirical analysis.

## 10.5. Empirical Validation

We test our model using the data sample as described in the previous section. Additionally, the input parameters reflect the results of our analyses. We assume log-normal distribution of propensity scores within banks. Following our description of the pricing methodology for risk-adjusted deposit insurance premiums, we calculate the value of the bank-specific put option for each bank separately, based on the propensity score and a time horizon of one year. This horizon corresponds to a scenario with quarterly premium payments. We assume total target premium payments of 0.0375% of covered deposits per quarter in order to reach the target fund size of 1.5% within a period of ten years.

To test our methodology, we split our data sample in two periods, one for the quarters 1-18 and one for the quarters 19-38. The first period is used to calculate the hypothetical premium payments in a calm market environment. We then use these payments and the information on which banks defaulted during the second period to compare the premium payments of failing banks with their surviving peers. If our pricing methodology is in fact able to identify banks with a riskier business model, we should find that premium payments are distinctively higher for the failed sample. Figure 6 Panel A to C (p. 194) show the resulting distribution of premium payments across banks. Panel A shows the distribution of the put values as calculated with our pricing methodology. The values range from 0.0000195 to 0.0639, with a mean of 0.0270 and a standard deviation of 0.0106. For the failing banks, the average is distinctively higher at a value of 0.0326. Keeping in mind that these hypothetical premium payments are calculated for a scenario where the failing banks are 5 years prior to their actual default date, it appears that tier 1 ratio and cash ratio do well in discriminating risky from save banks even in the medium- to long run. Panel B shows the actual premium payments in USD for one year based on our pricing algorithm. According to the findings of Panel A, the least risky banks in the non-failing sample are only charged marginal premium payments of USD 509. The maximum premium payment for the bank with the largest single risk amounts to USD 79.8 million, while the mean is USD 135,000. Taking the relatively long accumulation period into account, the average premium payments are necessarily quite modest. The larger differences between the failing sample and the non-failing sample as compared to

## Figure 6: Resulting Values at the End of Quarter 18
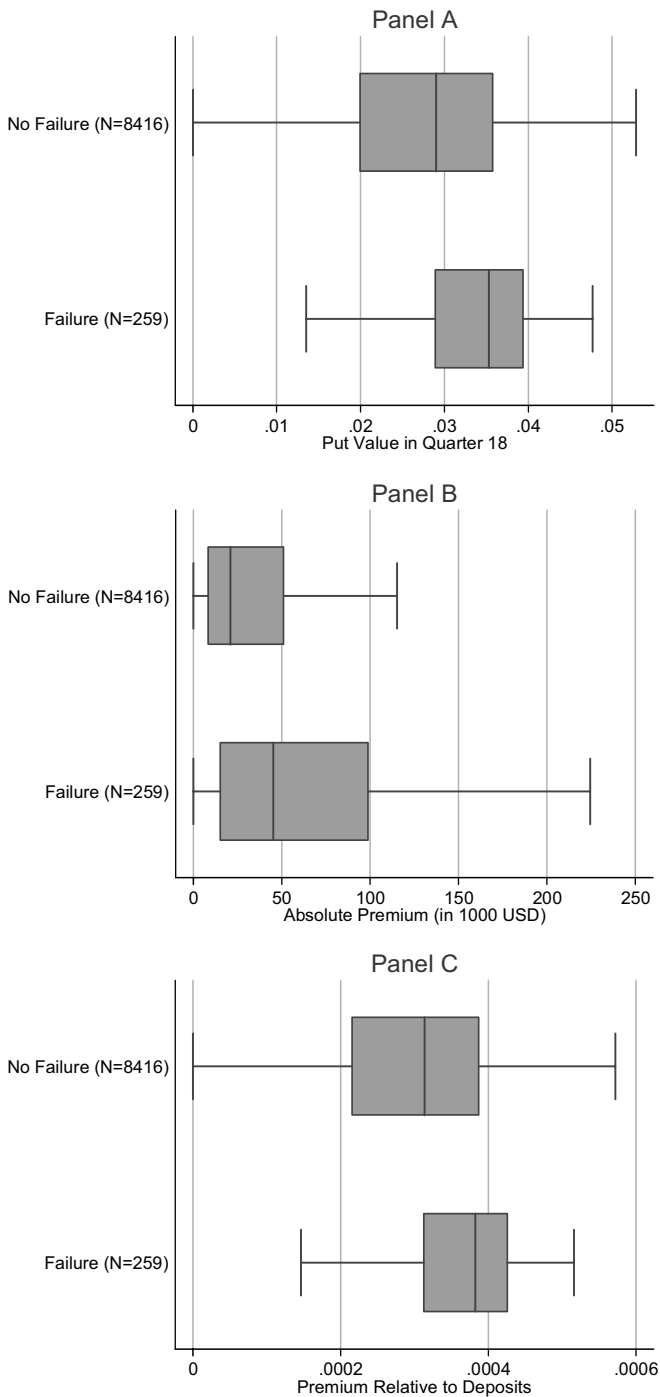
the put values reflect the above-average amount of deposits in the failing sample. Here, the mean premium payment amounts to USD 938,800 with a minimum of USD 59,000 and a maximum of USD 163 million. Panel C shows the differences in the premium payments per bank in relation to the respective insured deposits. By design, the dollar-weighted average of payments is 0.375% of insured deposits. The actual premium payments, however, range from virtually zero to 0.692% of insured deposits. While failing banks pay an (unweighted) average of 0.353% of insured deposits, their surviving peers only pay 0.293% of insured deposits.

In the next step, we test whether our model is also able to capture the worsening strength of banks on their immediate path towards default. Following our previous analyses on the discriminatory power of tier 1 ratios and cash ratios, we expect to find that, using a rolling window for the premium calculation, deposit insurance premiums should significantly increase for the banks that approach a default situation as opposed to the banks that did not default. Figure 7 Panel A to C (p. 196) show the results of this calculation using a rolling window of 18 quarters. All findings confirm the results from the previous analysis with a distinctive difference between failing and non-failing sample in quarter 18. Additionally, Panel A and Panel C show that the discrepancy between failing and non-failing banks dramatically increases when approaching the default date. Most importantly, the put values and premium payments of the non-failing sample remain at relatively constant levels throughout the whole simulation period while the payments for the failing sample sharply increase. With regard to premium payments relative to insured deposits, Panel C shows that the increase in premium charges is economically significant for the failing sample. Five years prior to default, the average premium payment amounts to 0.365%. In the quarter directly prior to the default, this value more than doubles to an average of 0.755%. When looking at the absolute premium payments in Panel B, it is interesting to see that all payments increase modestly over time, which suggests an increase in total deposits. However, this increase is more pronounced for the failing sample and adds to the increasing premium charges for this group.

In the final step, we want to test whether using a mean reverting process instead of the ordinary stochastic process in the calculation is reasonable based on the properties of our data. In the theoretical description of our methodology, we argue that mean reversion might be applicable for the evolution of tier 1 ratios and cash ratios. Additionally, we find that for both, tier 1 ratios and cash ratios, the values of most banks appear to cluster around pre-set target ranges. These ranges are influenced by a trade-off of higher costs associated with higher levels of capitalization and liquidity and higher risk of default associated with lower levels. Accordingly, it might be necessary to incorporate mean-reverting behavior also int the resulting propensity scores. Assuming a linear relationship between the propensity score and the mean reversion factor, it is possible to conduct an

Figure 7: Development of Values towards Default

Panel A

Panel B

Panel C
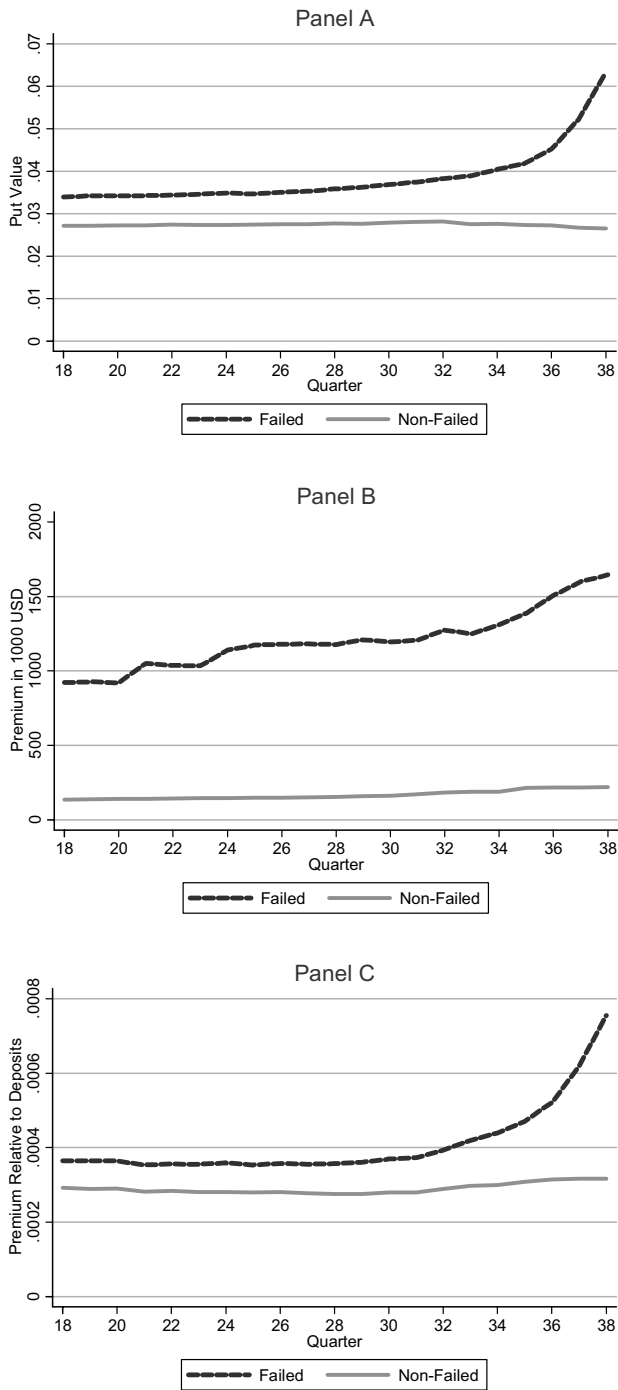
OLS-regression to estimate the magnitude of the mean-reverting effect. The dependent variable is the percentage deviation of the propensity score from its bank-specific long-run average; the independent variable is the percentage change in the propensity score in the subsequent quarter. The coefficient resulting from the regression is then equal to the mean-reversion factor in the Ornstein-Uhlenbeck process. The results of the regressions are summarized in Table II:

Table II: Results of OLS-Regression of PD-factors for Mean Reversion

Dependent: Change in Propensity Score During Next Period

Independent	Coefficient	Std. Error	t	P > |t|
Deviation from Propensity Score Mean	-0.0216***	0.00442	-4.88	0.000
Constant	*0.110****	*0.0109*	10.09	0.000
Method	OLS			
R-squared	0.001			
Observations	318,284			

The results suggest a statistically significant correlation between the change in propensity scores and its current deviation from the mean value. According to the coefficient, the mean reversion of propensity scores amounts to -2.2%, which means that, abstracting from any constant drift, the expected value of a tier 1 ratio in period t + 1 is 2.2% closer to its mean level than the ratio in t = 0. This value is statistically significant at the 1%-level. The negative sign of the coefficient is also in line with expectations meaning that the deviation from the mean value is expected to be decreased in the next step. These results suggest that there is in fact mean-reverting behaviour in the propensity scores of banks. However, the magnitude of this effect with 2.2% is very small and the effect would be constant across all banks in our calculation. In unreported robustness checks, we test the actual impact on our previous results. We find only marginal deviations from the base case without mean-reversion. Taking this finding into account, we conclude that, even though there is evidence for mean-reverting behaviour in the actual data, the effect seems to be too small to justify the additional complexity associated with the solution of the Ornstein-Uhlenbeck process.

10.6. Discussion

In the light of the recent financial crisis, the European directives on deposit insurance premiums, 94/19/EC as well as 2009/14/EC, are going to be revised, while the U.S.A already adopted several improvements (FDIC 2011). Accordingly, the design of risk-adjusted deposit insurance premiums is a hot topic in the academic

and the political discourse. While the theoretical concept of the approaches based on Merton are highly sophisticated, they are hardly feasible since the data required is simply not available. On the contrary, traditional expected loss models build on a point-in-time evaluation of bank stability and lack the ability to incorporate any time-variant dynamics. Since our approach combines elements of a multiple indicator model and option pricing theory, it is able to capture advantages of both approaches. The advantage of the option pricing approach is that it uses both, information on the actual value of assets as well as its historic values for the estimation of bank riskiness. A bank is hence c.p. more prone to default when it a) has a lower current asset value and b) historically higher changes in the asset values. This dynamic perspective comes at the cost that only one process is taken into account (*e.g.* the asset value). On the other hand, a simple multiple indicator model for the prediction of bank default offers the possibility to include several predictor variables, such as in our example one figure on capitalization and one on liquidity. It suffers, however, from the shortcoming that it only takes the current state into account and hence neglects any information on the variability of the variables. Our approach, in contrast, uses the dynamic perspective of option pricing models but is still able to aggregate several variables into the underlying process.

Our empirical analysis with data from the US banking sector shows that our pricing methodology is able to discriminate between risky and safe banks by charging higher rates to the failing banks. We additionally find that worsening conditions of a banking institution are also reflected in the premium. An introduction of mean-reversion in the underlying stochastic process might be reasonable in this context. However, we find that the data support mean-reversion only to a marginal extent. Our model might certainly be improved by extending the input variables for the logistic regression to a more sophisticated identification model of bank riskiness. Hence, we want to stress that our application with only two predictor variables is only an illustration of the potential applications of the pricing methodology. The liquidity figures introduced in Basel III are certainly one very interesting alternative to our current liquidity figure, once the data is available over a reasonable horizon.

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Abbreviations

Basel III	International framework for liquidity risk measurement, standards and monitoring
DIF	Deposit Insurance Fund
Directive 2009/14/EC	Directive of the European Parliament and of the Council of 11 March 2009 amending Directive 94/19/EC on Deposit-Guarantee Schemes as regards the Coverage Level and Payout Delay
Directive 94/19/EC	Directive of the European Parliament and of the Council of 30 May 1994 on deposit-guarantee schemes
DIS	Deposit Insurance System (*i.e.* other word for DGS)
JRC	Joint Research Centre (European Commission)

11. Conflicts of Interest in Investment Advice to Private Customers – A Call for Greater Transparency and Better Alignment of Interests

Peter Reedtz

Abstract

The financial crisis has placed renewed focus on the quality of investment advice given to private clients, and the issue of the impartiality of the adviser in particular. This paper looks at the concept of impartiality and ways of avoiding the classic conflicts of interest between the adviser and the client. It argues that a new set of rules should be introduced, governing the provision of advice to private clients, inspired by the standards and customs that apply on the professional advice market. It also calls for a paradigm shift in remuneration for the provision of investment advice. Implementing genuine impartial investment advice will inevitably lead to lower earnings for banks and others advisors in the short term, but long term, it will be amply offset by the benefits of a more balanced and ethical business model – especially when you take reputation risk into the equation.

11.1. Bad Advice

The financial crisis has made it all the more obvious that the quality of investment advice given to private clients large and small often falls way short of the mark. The phenomenon has been going on for many years, with the industry's ills escalating over the past 5-7 years. This unfortunate development is the result of aggressive financial product development, combined with the clients' increasing demand for a high return without significant focus on risk. Inappropriate incentive systems in the financial sector have only helped to make things worse. Here, we are not so much talking about bonus schemes and share options for senior management and specialists in market functions, but primarily the internal profit goals and sales campaigns, which largely determine the behavior of client advisers. Commission-based salaries (directly dependent on the sale of products and services) are not actually all that common among mainstream investment advisers. On the other hand, the indirect effect of organizational rewards (increased focus and promotion) is a highly significant behavior-regulating mechanism, which, in recent years, has in many places led to an aggressive sales culture in direct conflict with the interests of the client.

Figure 1 shows the four main elements of bad advice with appurtenant examples. The bad advice often contains more than one of the elements listed, in various unfortunate combinations.

Figure 1: Elements in the provision of poor investment advice

Problem	Description	Example
Professional incompetence	The client receives a poor solution due to the adviser's lack of product knowledge and/or inadequate knowledge of the financial markets' functions and options.	A client wants a high spread of risk in his portfolio. The adviser puts together a portfolio of 10 different unit trusts, which, in spite of their different names and providers have a high level of correlation and considerable overlap in the portfolios.
Inadequate risk assessment	Failure to analyse the client's risk capacity and risk attitude and/or inadequate knowledge of the products' risk characteristics.	An elderly widow, living off her savings, is recommended to buy bank shares and hedge funds for all her money.
Lack of impartiality	The adviser acts wholly or partially in his own interest rather than solely looking after the interests of the client. The adviser recommends the investment options which generate the best income for the adviser and/or his company in spite of the existence of better solutions for the client. This is a classic principal-agent issue.	An adviser recommends the client an investment product provided by the adviser's own company (with a relatively high sales commission) in spite of the existence of comparable or better products on the market, which would cost the client less.
Dishonesty	Fraud and deception to varying degrees. In extreme cases, the adviser simply steals the client's money. In milder cases, the adviser knowingly provides misleading/highly inadequate information or manipulates data in order to enrich himself at the client's expense.	Extreme case: Bernard Madoff's pyramid-like investment company is the most extreme example of dishonest investment advice to date. Milder case: Advisers who recommend high-risk, non-transparent products with very high sales commission, and who provide misleading information on the product's risk and/or fees to entice clients to buy the product.

Though it is fair to say that the quality of advice has not been good enough in many cases, it should also be stressed that luckily there are also many examples of qualified investment advice, which fully live up to both professional and ethical standards.

As is the case in all other industries, the financial sector has its good companies and its bad companies, and naturally, individual advisers cannot be gone over with a fine-toothed comb. Based on many years' practical experience and knowledge of the sector, it is the opinion of the author that there are, thankfully, many well-qualified and serious advisers.

This does not, however, change the fact that the system in general has a problem with the quality of advice given, and the question of impartiality in particular.

The main focus of this article will therefore be on the lack of impartiality in the provision of investment advice to private clients.

11.2. What is Impartiality?

Impartial advice means that the adviser takes only the client's interests into account and is not influenced by factors such as his or her own earnings or a desire to sell a certain product.

On the surface, this is a very basic and obviously reasonable demand to make on any form of advice giving.

Many forms of advice are, however, given in connection with a customer's purchase of a product or service. The purchase of cars, household appliances and other small consumer goods is often accompanied by advice on the product's qualities and suitability with regard to meeting the customer's needs. This is perfectly acceptable as long as the customer is fully aware of it. When the Ford retailer advises the customer looking to purchase a car, it is only to be expected that he will try to persuade the customer to buy a Ford and not a Toyota. It is not quite as obvious to the customer what the motive of the investment adviser is when he or she recommends a given investment product. Historically, many private clients have been under the impression that the investment adviser is impartial, and that the advice given is in the client's interest only. As there is major inertia in clients' perceptions and behavior in the financial sector, this remains a common picture today, in spite of the many scandals involving investment advice and significant media focus in recent years. Many people perceive the bank adviser as being on a par with solicitors or accountants, who, by law and their observance of professional standards, principally look after the client's interests (within the framework of the law, naturally). In the same way that a consulting engineer is typically perceived as independent, *i.e.* not in league with a particular tradesman or contractor, whose services he secretly tries to sell in order to earn commission for himself.

Today, it is a fact that the financial sector is run in the same way as any other sales-oriented business. There is nothing wrong in that, but it is important to be open about this to clients to create consistency between the client's expectations and reality.

In figure 2, a more detailed explanation of impartiality in the provision of advice is given by outlining three comparisons of the concept.

Figure 2: Three comparatives of impartiality in the provision of advice

Pure impartiality	Pragmatic solution	Unacceptable lack of impartiality
Only takes the client's interests and needs into account.	Takes the client's interests into account to the greatest possible extent, but the adviser has a preference for products which generate the best possible income for the advisory firm, unless obviously in conflict with the wishes and interests of the client.	The adviser's earnings motive weighs heavily in the choice of solution, which is often based on campaign sales rather than the client's actual needs.
Does not sell own products	Primarily sells own products combined with the external products of business partners selected on the basis of competence and quality.	Sells own products and external products from the business partners that offer the highest commission
The adviser's income is solely based on a set, agreed fee (fee-only structure). Irrespective of the choice of products, no commission and no performance-dependent fee.	The adviser's income consists of a combination of visible, agreed fees and hidden sales commission, stock commission, etc. Portfolio management agreements generally contains performance fees to the adviser with benchmark and high-watermark.[a]	The adviser's income is typically hidden in the form of kick-backs from the sale of specific products. Performance fees are calculated without a proper benchmark and without high-watermark.
The client is informed proactively, and without having to ask, of any conflicts of interest, business partners, etc. There is complete openness about the adviser's earning structure and incentives.	Information about any conflicts of interest, business partners, etc. is given reactively and is typically available on the adviser's website or appears in disclaimers. There is partial openness about the adviser's income, as the principles are stated, but not the specific rates and implications for the client's return.	Information is not provided on any conflicts of interest, business partners, etc., and the client is generally kept in the dark about the adviser's earnings structure and incentives
The adviser works on the basis of a specific written ethical standard, which is more stringent than the statutory minimum requirement. The client is informed proactively about the ethical standards.	The advice provided meets the minimum requirements of the MiFID rules[b], but is not based on specific ethical standards, which are more binding than formal statutory requirements. The rules are typically available via a website, and compliance with the MiFID obligations takes place via standardised IT solutions in an "assembly line" style.	Ethics is a foreign word and the MiFID rules are complied with formally and to the letter only, far from in keeping with the spirit of the rules.

a. A high-watermark clause takes fluctuating return into account in the individual measurement periods, so that negative return from earlier periods is offset in future positive return before calculation of the performance fee. The performance fee is not triggered until the portfolio's historical peak (high-watermark) is exceeded.

b. The MiFID Directive (Markets in Financial Instruments Directive) contains a number of rules designed to protect the investor and was implemented in EU in November 2007. The EU Commission has initiated a review and reinforcement of the rules, and a draft version of the new Directive is expected to be published in July 2011.

In practice, few private client advisers, today, meet the requirements for pure, impartial advice. The vast majority of advisers should probably be placed in the pragmatic middle solution or in combinations of the different comparisons with the weight in the middle category. Unfortunately, there are also some advisers whose activity is primarily characterised by an unacceptable lack of impartiality. Many of the adviser liability cases in recent years are rooted in behavior matching the third column in the figure.

11.3.   How Should an Investment Adviser be Remunerated?

As figure 2 shows, much of the problem involving impartiality relates to the form of remuneration. There is often a fundamental conflict between the adviser's financial interests and consideration for the client.

The pure solution to the problem is that the adviser is only paid a set, agreed fee for his efforts and knowhow, either based on an hourly rate (as used by other impartial, professional advisers and consultants) or possibly a percentage share of the assets under advicement.

In the model, the adviser's pay is totally independent of transactions, choice of specific investment products and performance.

The pure model is used to certain extent on the professional market, where clients typically have the same professional insight as the advisers, and where negotiation of the terms for the provision of advice takes place on an equal basis. Where performance pay is used on the professional market, more sophisticated models are typically used which take account of the benchmark and level of risk and contain high-watermark clauses.

It is quite a different story on the general private market, where there is considerable informational asymmetry. The client is not typically aware of what it actually costs, as most of the payment is not directly visible, but consists of hidden commission. The advice itself is often seen by many retail clients as a free service.

This form of remuneration is problematic both for the client and the adviser. The client can neither grasp nor compare costs and will often end up paying too much. And the adviser is in a dilemma. If you provide pure, impartial advice at a high professional level, you earn very little as the transaction volume is low and the products selected are cost-effective (*i.e.* low sales commission). If the adviser wishes to earn a decent salary – and thus stay in business – he has no choice but to compromise on impartiality and seriousness and recommend the client a relatively high transaction level and a choice of product with slightly higher costs (= commission earnings). In the long-term, however, the latter solution makes for less satisfied clients (on the basis of the motto that the truth will always out) and

may, in extreme cases, lead to compensation cases and negative press with subsequent significant loss of image. *Reputation risk* has for many bank managers shifted from being a theoretical concept in a risk management report to an extremely serious challenge in the real world.

In theory, the solution to this dilemma is simple. Banks and other advisors must make a paradigm shift. The form of remuneration must be changed radically so that the client pays a fair and transparent price for the advice – according to the pure, impartiality principles described above. In return clients only pay modest transaction fees, which cover the costs associated with the transactions as well as a reasonable profit margin.

Performance-related pay is seen by many – including the more critical clients – as a fair and adequate form of remuneration. As many see it, the adviser and client achieve a healthy shared destiny.

If all goes well, you pay a high fee; if it goes badly, it is free. No cure no pay. It is not, however, quite that simple and the performance-related form of remuneration is often problematic and far from consistent with the principle of pure impartiality. The problem is the model's built-in asymmetry. The client bears the full risk of the investment, but shares the gain when it goes well. Admittedly, the adviser does not receive payment when there is no return, but the adviser does not share the risk of loss, as any loss is borne by the client alone. This typically makes the average payment much higher than the client believes. The adviser also has an incentive to run relatively high risks, as the adviser de facto has an option, which, as we know, increases in value with increasing volatility in the underlying asset. Box 1 illustrates the problem by a simple calculation example from the real world.

> **Box 1**
> **The inappropriateness of performance-related pay, illustrated by an example.**
>
> A client has entered into an agreement for the management of a portfolio of US small cap shares. The agreement has been in force for 10 years (1999-2008). It has been agreed that the agent will receive a fee of 15% on the excess return achieved every year in addition to the market yield on short-term US Treasury Bills.
> It is assumed that the portfolio has provided a return equal to market return. The average return on the share portfolio has during the period amounted to 6.44% p.a., and the return on the short-term Treasury Bills has on average been 3.20% p.a. The client will therefore expect, on average, to pay (6.44% -3.20%) x 15% = 0.49% p.a. in performance fee to the agent.
> The figures below show the actual return and excess return year-by-year in the period 1999-2008.
> Furthermore, the performance fee is shown, both with and without a high-watermark clause.

Year	Return US small cap shares	Excess return on US Treasury Bills	Performance fee without high-watermark	Performance fee with high-watermark
1999	29.79%	25.11%	3.77%	3.77%
2000	-3.59%	-9.48%	0	0
2001	22.77%	18.94%	2.84%	1.42%
2002	-13.28%	-14.93%	0	0
2003	60.70%	59.68%	8.95%	6.71%
2004	18.39%	17.19%	2.58%	2.58%
2005	5.69%	2.71%	0.41%	0.41%
2006	16.17%	11.37%	1.71%	1.71%
2007	-5.22%	-9.88%	0	0
2008	-36.72%	-38.32%	0	0
Geometric average	**6.44%**	**3.15%**	**1.99% = 63% of excess return**	**1.64% =52% of excess return**

Source: Ibbotson SBBI 2009 Classic Yearbook, 2009 and own calculations

The figures show that the considerable variation in the annual return means that the actual average performance fee is significantly higher than the average returns would lead one to believe.

This changes only slightly with the use of high-watermark. In this example, the performance fee amounts to 63% and 52% respectively of the excess return (average over the 10-year period), and not 15% as you would expect.

High-watermark clauses may reduce the problem of asymmetry, but they far from solve it completely. If the good periods come before the bad, there is no help to be had from these clauses, and the clauses' calculation technique typically has a clear bias in favor of the adviser/agent.

Another fundamental problem with performance-based remuneration is the length of the period of the return statement. With relatively short time horizons, it is well-known that return and performance are fairly random and far from indicative of the adviser's competence. You often have to look at periods of five to seven years to separate good fortune from competence (or misfortune from incompetence). Added to this is the fact that intelligent and accurate benchmarking is no easy discipline. All factors that help to make it extremely problematical to use this form of remuneration in a fair and impartial business model.

11.4. Suggested Improvements

How can we improve the situation so as to achieve higher quality in general and the greatest possible impartiality?

Pure impartiality is best achieved in a system where advice on and the sale of products are entirely separate. This principle is not unusual in the professional market, but for typical private clients it is probably more utopian than realism to

achieve this desired state in practice. This is due both to the costs of distribution and the difficulty in breaking a longstanding pattern[1].

Figure 3 provides an oversight of the more realistic options for improving the situation. In the following, the individual options will be discussed briefly.

Figure 3: Possible solutions

| 1. General education and informing of clients |
| 2. Improved information on products and services |
| 3. Certification of advisers |
| 4. Product restrictions |
| 5. Mandatory ethical standard |
| 6. New form of remuneration |

Ad 1. In theory, all problems could be solved if the clients gained greater professional insight, thus levelling out the 'balance of power' between the client and adviser. This could for example be done by increased public information on basic investment theory. There is plenty of inspiration to be had from the excellent information campaigns and websites developed by the supervisory authorities in the US and England[2]. Even the financial media and private shareholder associations and the like may play a role in the education of private clients.

But unfortunately, it is not realistic to believe that the problem could seriously be solved this way. The majority of clients have neither the interest in nor the resources (time or intellect) to do anything about this. Added to this is the fact that the financial world is becoming more and more complex, making it difficult for clients to remain sufficiently updated to challenge the advisers to any real degree.

Ad 2. This has historically been the preferred tool of the politicians and regulators. Over the years, a number of disclosure obligations have been introduced for providers of financial services. There are comprehensive prospectus requirements for different kinds of investment products, duty of disclosure in respect of fees, commission rates, brokerage, etc. Added to this are rules about information on historic return and risks as well as information to the clients about potential conflicts of interest. The European Union implemented in 2007 the well-known MiFID directive, which contains comprehensive investor protection rules. All

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[1]   On the European market, there are still relatively few impartial investment advisers who target their services at private clients. In other countries such as the US, impartial advice is more widespread and is part of a real industry with a growing market share.

[2]   See, for example, the informative websites of the American Securities and Exchange Commission (SEC), www.investor.gov and the British Financial Services Authority, FSA, www.moneymadeclear.fsa.gov.uk.

laudable and well-intentioned initiatives, which unfortunately has not solved the fundamental problem.

The problem with the obligation to provide information is that clients either cannot find the information in the ever-growing jungle of information or do not understand how to use to information for any real purpose.

Ad 3. Another proposed solution, also based on information and education, is the idea of introducing the mandatory certification of investment advisers. The objective is both to improve and streamline the professional standard, but also to discipline the stand, so that bad advisers can be stripped of their right to provide advice. This proposal will, without doubt, be a step in the right direction and will also help to solve the issue of quality in advisory services in particular.

But certification is not in itself a guarantee of impartiality and does not solve the problem of inappropriate remuneration.

Ad 4. Bans and restrictions are classic forms of regulation, which have also been put forward in this context. It could quite simply be made illegal to sell complex investment products to private clients, and it could be decided by law which standard portfolios, etc., different client profiles are to be offered. Grosen and Tanggaard (2009a and 2009b) argue for the introduction of certain specific product restrictions to protect clients.

However, experience of this type of restrictions is not good. It puts an unnecessary damper on healthy, legitimate innovation and product development, probably doing more harm than good. Furthermore, restrictions and bans can often be circumvented by creative maneuvers and promote unhealthy parallel markets. Ultimately, in conflict with the interests of the clients and society in general.

Ad 5. Ethical standards ring hollow in many people's ears. But for those companies and organizations that work seriously and continuously with ethical standards as a major part of the company's/organization's core values, they are a powerful tool, which solve many problems before they arise. A good example of this is the serious and extensive work with ethical standards carried out by the CFA Institute, an international organization for investment professionals[3]. What matters here is that the rules are mandatory for all members and candidates of the CFA Institute, and that there are strict disciplinary sanctions if the rules are not followed. The seriousness is underlined by the fact that ethics are an important part of both the teaching and exam for CFA Charterholders. The rules are supplemented by a comprehensive 220-page handbook, which sets out how the principles should be used in practice and contains a number of illustrative examples.

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[3]   For further information, see CFA Institutes website: www.cfainstitute.org.

The European organization, EFPA (European Financial Planning Association) works with an ethical standard for financial advice, which can be a good source of inspiration, although it is not nearly as comprehensive and consistent as the CFA standard. Many countries has chosen not to work with disciplinary sanctions for the breach of EFPA's ethical standard and awareness and use of the standard is still modest in many countries.

An actual mandatory ethical code would solve many of the problems involving the provision of advice mentioned in this paper. Such standards contain rules and principles which ensure a high professional quality, whilst also ensuring a high level of fairness in the advisory work. It is stated by the CFA Institute that "members and candidates must act for the benefit of their clients and place their clients' interest before their employer's or their own interests." A simple, yet strong principle.

Very few of the investment advisers who advise retail investors are currently members of the CFA Institute. It is typically for people who work with professional clients. And EFPA's standard has not yet been implemented in practice in Europe. But it would be reasonable for the authorities, in collaboration with trade associations, to establish a European ethical standard for the provision of investment advice to private clients. Possibly a 'light version' compared to the ambitious CFA Institute standard, but without compromising on the basic substance: high professional standard, integrity and impartiality, with the client's interests at the centre.

This would benefit both clients and advisory companies alike (both banks and independent advisors). The advantages for the clients are obvious, but the introduction of such a standard would also be beneficial for the advisory firms. A whole-hearted and committed approach by the companies is vital. Traditionally, these kinds of standards are seen by far too many as a necessary evil, which simply has to satisfy a few statutory requirements, and provides no real business value. The far-sighted, intelligent advisor has another proactive approach to ethical standards entirely, and will soon realize that, ultimately, they can be highly productive.

It would be a strong pull of the management if some of the large banks led the way and took the initiative to implement a high ethical standard on the initiative of and anchored in the senior management. It would certainly eliminate any mistrust in the concept of ethical standards.

Ad 6. As noted earlier, there is a need for a fundamental paradigm shift in the remuneration model and pricing structure typically used when providing investment advice to private clients. There needs to be transparency and logical consistency between what you get and what you pay for it. Set agreed fees and/or hourly

rates must be the mainstay of the remuneration form, and transaction fees should only reflect the use of resources and a reasonable profit margin. This way, both the client and the adviser will be better off than with the opaque and illogical confusion of 'free services' and hidden and visible fees, which are the norm in the industry today. See a simple illustrative example in box 2.

Box 2
Comparison of two models of pay – a simple example

A client has inherited EUR 100,000 and seeks the advice of an investment adviser. The adviser spends a total of 3 hours analyzsing the situation and meeting with the client. Based on the client's investment motive, risk profile and tax conditions, the adviser recommends a portfolio of different unit trusts.

	MODEL 1 (current remuneration principle)	MODEL 2 (new and improved principle)
Fee for time spent	EUR 0	3 hours @ EUR 150 = EUR 450.
Sales commission	1% of EUR 100,000 = EUR 1,000	EUR 0
Brokerage	0.25% of EUR 100,000 = EUR 250	0.15% of EUR 100,000 = EUR 150.
In total	**EUR 1,250**	**EUR 600**
Of this visible to the client	EUR 250	EUR 600

Model 1 is characterised by a relatively high cost, the majority of which is not immediately visible to the client. Note that the 'canny'/informed client in this model can receive 'free' advice and then carry out the transaction himself via a cheap online broker, who has low brokerage and offers unit trusts without sales commission. Model 2 has full transparency and is fairest to both the client and the adviser.

The client pays for the advice received and execution of the transaction (the actual service), and the adviser does not risk being used simply for free advice, without any business coming from it.

It should be noted that the adviser's fee/hourly rate, with the tax rules that apply in some countries, represent a challenge, as private clients are not typically able to deduct adviser fees. Naturally, this can be solved by converting the fee to brokerage, but the ideal solution is to change tax laws so that costs for investment advice are deductible, regardless of the collection form.

Some would probably argue that banks and advisors would thereby experience a drop in income on the lucrative investment advisory business. This would undoubtedly be the consequence, but it would then be amply offset by the positive earning effect of the increased credibility and re-established trust, which would be the consequence of the paradigm shift.

The current model gives periods of high earnings but also generates losses for the banks (both image-wise and also directly on the short-term bottom line), when the party is over and market development turns abruptly (which, experience

shows, happens 1-2 times during a typical decade). The proposed new model will, however, give a lower, yet far more stable and sustainable income. As a curiosity, you could probably argue that the new model will lead to a lower capital requirement than at present (on the concept of economic capital), as the operational risk (including reputation risk) will be considerably lower than with an ethically sound business model with a fair and logical form of remuneration.

11.5. The MiFID Review and the UK Retail Distribution Review

As a follow-up on the financial crisis the European Commission have launched a consultation on the review of the MiFID directive. A draft version of the new Directive is expected to be issued in July 2011. The review contains some minor measures to strengthen retail investor protection, but the main focus of the revision are in the areas of market structures and securities trading with little real impact on retail clients.

There is much more value for money in the Retail Distribution Review (RDR) launched by the British FSA. The RDR will come into effect at the end of 2012 in the UK and the aim is to go beyond simply treating the symptons and address the root causes.

By introducing the RDR the FSA will set a new standard of independent investment advice to retail customers. The RDR will ban the use of commission paid by product providers to advisors. The clients will pay directly for the services to the advisor.

The RDR also introduces a clear distinction between 'independent advice' and 'restricted advice', the latter describes a situation where the advisor is only offering a limited range of products (often his own) to the client. Independent advice has to be based on a comprehensive and fair analysis of the relevant market. The RDR also introduces measures to increase the professional standards of investment advisors, including the introduction of an annual statement of professional standing from an accredited body. A new Code of Ethics is also part of RDR.

Overall, one must characterize RDR as a groundbreaking step towards a better and more sustainable market for impartial investment advice to private clients. Hopefully the European Commission will be inspired by the work of the FSA in their efforts to improve the MiFID directive.

11.6.   Conclusion

According to the author, the solution to the fundamental problem addressed by this paper lies in a combination of several initiatives. First and foremost by the introduction of an obligatory new ethical standard for the provision of investment advice to private clients. Inspiration can be drawn from the international standard developed by the CFA Institute and from the work done by the British FSA. Anyone wishing to operate an investment advice business would have to submit to this new standard. Notwithstanding the mandatory element, it is vital that the initiative has the full backing of senior management and that the standard becomes a natural part of the business culture. It is the management's responsibility to ensure a high advisory ethic and an appropriate incentive structure. The individual adviser is dependent on his employer's business model and is not normally in a position to change things.

Secondly, there is a need for a new form of remuneration which can reduce the built-in conflicts of interest and create greater transparency and natural cohesion between what you get and what you pay for it. Again the proposals from RDR shows the way.

In addition, the work to improve the level of education of clients and advisers would have to continue, ensuring that relevant consumer information is available and usable to a higher degree than is the case today. These initiatives do not however move the fence posts, but can provide excellent support for the above-mentioned main initiatives.

Overall we must conclude that it is highly realistic to achieve a considerably higher degree of impartiality and quality in the provision of investment advice to private clients. But, besides good initiatives from farsighted regulators, above all, it requires a willingness and initiatives on the part of the management of the financial advisory firms. Without this, impartiality will remain a utopian state[4].

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12.   Views on Bank Strategy and Capital Market Infrastructure
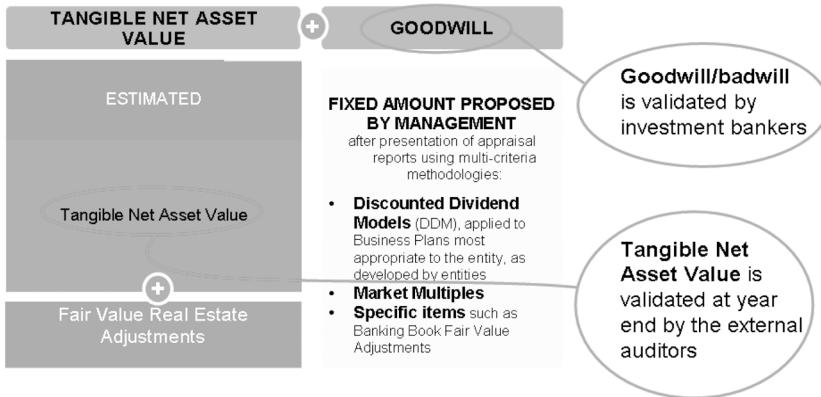
Lars Machenil and Lieve Mostrey

12.1.   The BNP Paribas Fortis View by Lars Machenil

First of all, allow me to present some core figures about BNP Paribas Fortis: it is a company with around EUR 350 billion in assets, around EUR 1 billion in profit, and about 16.5% in Tier 1. What I would like to do here is to build basically on what Rudi Vander Vennet has shown us about the use of levers and their different impacts. I will give a practitioner's view on what this means in practice because you see these levers and you have regulation in general which is changing and then you have all kinds of stakeholders in banking from the board to the commercial banker, who basically have to implement and execute this and have to deliver on those choices made. I will do this through 2 approaches: I will give you an example of how a board is impacted by all these changes and I'll do this by showing divestment, because, many banks are having to make a choice of being a retail bank or being a universal bank. Typically the bank has to make a strategic choice and divest many activities which are no longer core, whether by choice, or by regulatory decree, or due to whatever environment prevails. Doing this is not necessarily easy, indeed, it would be appropriate to liken it to being a minefield, where strategic choices must be taken to successfully negotiate the safe path through the minefield. Regulation is restrictive in many aspects, then there is also the whole element of valuation as well as several operational constraints. So indeed tackling such constraints, we started by focussing on the bank's core – which in the case of BNP Paribas Fortis is Belgium, Luxembourg, and European commercial banking platforms. Figure 1 (p. 218) gives the key elements of the industrial plan.

But regulation is also involved. I will return to Basel III and others, but there are many other regulations that are also applicable in Belgium. For example, Article 524 of the Belgian Company Code (BCC) tries to manage intra-group conflicts because many banks today have a typical stakeholder but typically have a/or many minority stakeholder(s). In the case of BNP Paribas Fortis, this is the Belgian state. This Article is very prescriptive, in protecting intra-group conflicts. It sets out four guidelines: firstly, it has to create a committee of independent directors, secondly, this committee has to appoint independent experts, thirdly, management has to make proposals and finally the committee has to render a motivated opinion to the board. Now this might sound quite easy but it has a strong degree of regulation, because many lawyers are involved as well as, many invest-

Figure 1: Divestments as part of the Industrial Plan
Articulate an overall strategy from which priorities (e.g. divestments) are derived

ment bankers, for example you have your minority stakeholder and their investment banker, you have your management with another investment banker, you have majority stakeholder and their investment banker. So it is something which quickly becomes quite complicated to do and in particular if you want to do many divestments within a short period time, it is quite a complicated process.

Furthermore, the handling of valuations and cut off dates is essential. It starts with the defining of the tangible net asset value which you is defined at a single point in time by external auditors, and defining goodwill on investment bankers. This process allows you to channel all this regulation in a framework, getting everyone involved and allowing for a period of less than 18 months to go from a balance sheet which was close to EUR 600 billion to one which is at EUR 345 billion today. I am sure that you recognise many of the countries where these divestments have taken place. This is a small example of the new paradigm as well of regulation. Figure 2 illustrates this process.

Now I want to express some views on Basel III. I have previously talked about how to make sure the board can play its role, I would also like in turn to talk about how the banker can play his role because while it is very nice to set up an overall strategy, in the end you have to make it happen on the floor. I would like to share with you what Basel II and Basel III do.

Basel II had a heavy impact on systems because you have to be able to reflect all the risks of the assets into your systems and your calculations and so on and so forth. However, in Basel III it will be quite different. The system impact will be very limited, but there will be a very big impact on the business. Why? Because it

**Figure 2: Handle valuations & cut-off dates**

involves many more aspects: it used to be only capital, whereas now it also handles accounting, risk, regulation and many other measures. So what happens if you are the commercial banker who is confronted with all these things even if you have made a choice to be a retail banker with a commercial European footprint? This is still a challenge to make it happen on a day to day basis. Let me illustrate this. In the past, Basel III focused on the assets and it focused on the capital requirements, and basically was handled through transfer pricing service. Nowadays things are be totally different, you have many criteria and they will not always necessarily be coherent and they are not necessarily expressed in very simple matrices. If you look at the capital elements contained in Basel III you would like to get your leverage as low as possible. We have seen that low leverage might be a good thing and you could say I have investment books *e.g.* investments in government bonds and I would like to get them out because I would like to re-use my assets, it will improve my leverage. However, if you then go into the liquidity rules you will see that it is not necessarily a very bright idea because the liquidity rule says that you need assets which can be made liquid in the very short term. So if you are a banker on the floor and you have to decide how to implement it on a day-to-day basis, it will not necessarily be that simple. Once we have fathomed the whole impact, we then have to address the regulatory environment, and then a challenge which will remain is how to manage this in a very pragmatic manner, so that basically Basel III is far from over. It will prove to be a long and winding road.

12.2.   Euroclear's View by Lieve Mostrey

I would like to start my presentation by reminding you how the different layers of market infrastructure within the international capital markets interact with each other.

Figure 3: The Roles of Different Market Infrastructure in the International Capital Market Value Chain
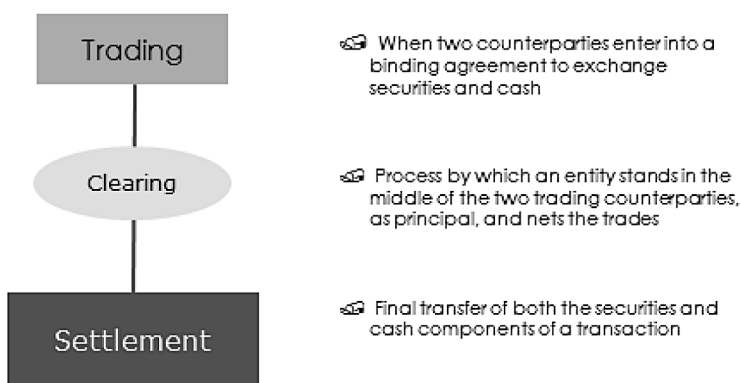
The first layer in the value chain is trading, where orders are negotiated and agreed. This can happen on stock exchanges, multilateral trading facilities, over the counter or off market. Orders can be instructed by humans or through machines. It is here that the binding agreements to trade securities for cash are made.

The second layer is composed of clearing activities. Clearing today involves a central counterparty that stands between the different trading counterparties. Its purpose is to match all the buy and sell positions between the two counterparties, reduce risks by standing between the two counterparties and net all the transactions in the same security before sending instructions to the settlement agent. The third tier – settlement – is where the securities and cash are actually exchanged by firms such as Euroclear. This is where the change of ownership occurs, irrevocably.

Let's now take a look at Euroclear operating in that settlement space. Euroclear is first of all a user-owned, user-governed company. This means that around 1,300 broker dealers, local and global custodians, commercial banks and other financial institutions worldwide strongly influence our direction, strategy and development. This is quite a different governance model. We believe that this form of ownership and governance ensures that we give high priority to the interests of our clients. At the same time, we operate under what is called a profit-

constraint model. We think this strikes a good balance between, on the one hand, bringing the necessary cost discipline in the company to reach a certain level of profit, but which, on the other hand, allows us to sometimes make important investments that benefit the entire market, but generate no profits for us. You will see what I mean later on.

If we look at the composition of the Euroclear group, there is Euroclear Bank, the International Central Securities Depository, or the ICSD as we call it. It is the largest of its kind in the world. We also serve as the national CSD for seven countries, namely Belgium, France, Finland, Ireland, Sweden, the Netherlands and the UK. Together, we cover about 65% of the EuroTop 300 equities, 50% of the European domestic debt markets and 60% of the Eurobond markets. This translates into huge volumes of activity. Euroclear settled transactions over the course of 2011 valued in excess of EUR 580 trillion, representing more than 163 million transactions. We hold today in our different entities securities deposits worth more than EUR 22 trillion. And, we move EUR 500 billion of collateral every day. We estimate that every six days we process transactions that are equivalent to the GNP of the entire European Union. Therefore, we think it is logical that we are considered to be a systemically important provider of infrastructure services.

Obviously, risk management is very critical – not only for ourselves, but for entire markets and market participants. First of all, market participants increasingly are trying to protect themselves from credit and counterparty risks, which translates into moving from unsecured to secured transactions. Clients are now using various forms of collateral to secure exposures that arise from repo transactions, derivative transactions and from a wide range of other security financing transactions. Accordingly, we have seen demand for our tri-party collateral management services soar. As said earlier, we now manage EUR 500 billion of collateral movements every day; volumes continue to grow regularly.

Given our critical role, we also have to operate in a very safe way and protect ourselves against risks, including credit risk, although in practice most of our credit risk exposure is intra-day as it relates exclusively to the transaction settlement process. Nevertheless, in practice, we demand from almost all our clients full collateralisation of our credit extensions in order to remain the systemically safe service provider we have to be. We can say that this business practice was most severely tested during the recent financial crisis, when Lehman Brothers and MF Global went bankrupt. Our risk mitigation processes and asset protection models worked very well. We suffered no credit losses whatsoever during the crisis and continued to operate safely and consistently. This record has been recognised systematically over the years as we have maintained very high credit ratings. I can also confirm that our solvency ratio is very high, currently at a

strong and healthy 55%. We are also observing in the national markets where we operate a growing demand from clients for collateral management services. We are developing that part of the business further within our national CSDs.

A very particular and peculiar phenomenon that we witness during periods of crisis is that Euroclear is considered by market participants as a source of protection against market risk. This was evidenced by our clients leaving huge cash balances with us during the crisis. We were seen as a safe haven, as an entity which market participants would trust with their cash, even though we paid no interest on cash balances. Settlement infrastructures have also been substantially helpful to market participants in managing their liquidity risks. As you know, central banks have played an important role in sustaining liquidity during the crisis, in particular by accepting various types and grades of collateral. As a result, collateral criteria shifted very quickly, with central banks accepting lower grade securities as collateral. This resulted in big securities movements within the markets, where the settlement agents played a material role in supporting them. Government debt only accounts for around 11% of the collateral that is held within the Eurosystem today where 77% of the collateral that is used in the European interbank repo market is now government debt. This is quite different from pre-crisis trends.

A further dimension is operational risk. Very clearly, in the post-trading business we have no ambition to be glamorous; we perform a back-office function which is often considered boring and dull, but which has to be unquestionably safe. So, we have been working and we are continuing to work on tightening our operational controls to be extremely reliable in our function. For example, we are among the few infrastructures that operate three data centres, of which two are permanently live and the third is located in a different country. In the event of a local crisis, we can ensure that all data will be restored in a second centre within two hours, without any loss of client transaction data. This is not only a tested scenario, but is deployed operationally every two months. This means that every two months, we fully change the environment in which we run our operations.

Our manpower and office structures are equally important. We have a dual-office policy in all of our countries, which means that we have two fully manned and operating sites that are mirrored back-ups of each other. Each can replace the other if needed. The origins of this policy are linked to the 9/11 attacks, where our US clients became highly sensitive to office back-up issues. This policy also relates to our profit-constrained business model in that we have not been pushed by our owners to look for cost-cutting or economy measures for these set ups. They have remained unchanged during the financial crisis because they add value, and not necessarily profits.

Post-trade infrastructures are highly regulated entities. For Euroclear alone, we are regulated or supervised by no less than 13 public authorities. It looks very likely that this number will not be reduced, and in fact, we see the European Commission also entering this space with the introduction of a CSD Regulation.

Regulation will change market behaviours. We expect to see extended funding maturities, thereby preserving liquidity pools. We also expect to see a greater need for collateral. Collateral requires moving not only cash-based collateral, but also securities-based collateral in order to make the financial markets safer.

There has been a lot of talk about introducing more central clearing counterparties in some markets and also for a number of transactions that have not been cleared thus far. It is expected that multilateral netting could act as a kind of firewall against defaults. But let us not forget, and let us remain very realistic, in remembering that central counterparties do not eliminate the risks totally; they transform and concentrate them. So, we will also have to look at how these central counterparty models evolve and how they will be introduced. We strongly believe that bridging infrastructures across assets classes could bring a lot of value to the market. We believe that the governance models, how we manage the bridging process and how we use them, will have great importance for market participants and the infrastructures. There is a risk with some of the current models that clearing counterparties may start to compete for market share at the expense of sound risk management practices.

The crisis has substantially increased awareness of and attention to the many forms of risk in our financial markets. At Euroclear, astute risk management is part of our DNA. Although we instil strict policies on our clients, we think past events have proven this approach to be very important. We, just like the other providers, have learned some lessons and a number of tough decisions in the past have been vindicated. We are constantly improving and strengthening our risk management and systems and, as always, they don't necessarily have to be complex models. Old fashioned common sense can achieve a lot as well.

We will see new market initiatives, the implementation of lots of regulations and TARGET2-Securities, and new business models. We believe that what has been gleaned through past experience should not be lost. We've heard a lot about banks being 'too big to fail' and by paying attention to that, we have realised in the infrastructure business that we also need to manage our business as if failure is not an option.

Obviously, future risks are ahead of us. I think that every type of new regulation will merely alter the extent of the next crisis, rather than totally remove the prospect of a future crisis.

I would like to conclude with a word of recognition for the robustness of the market infrastructures, which comes from a highly valued, but neutral observer, Baron Lamfalussy, who said:

> *"The clearing, settlement and payment systems deserve particular praise. Few people, including financial market participants, let alone governments and the general public, are aware of the amount of effort that has been invested over the past 20 years into enhancing the crisis resistance of these systems. The investment has been rewarded by high returns."*[1]

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[1]   Baron Alexandre Lamfalussy, former Chairman of the Committee of Wise Men on the Regulation of European Securities Markets, 2009.

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