The Quest for Stability: the macro view

The Quest for Stability: the macro view

Edited by
Morten Balling, Jan Marc Berk and Marc-Olivier Strauss-Kahn

Chapters by:
Willem H. Buiter
Stefan Gerlach
Clemens J.M. Kool
José Viñals

A joint publication with de Nederlandsche Bank and Rabobank

SUERF – The European Money and Finance Forum
Vienna 2010

SUERF Study 2010/2

larcier

CIP

THE QUEST FOR STABILITY: THE MACRO VIEW

Editors: Morten Balling, Jan Marc Berk and Marc-Olivier Strauss-Kahn

Authors: Willem H. Buiter, Stefan Gerlach, Clemens J.M. Kool and José Viñals

Keywords: asset prices, bubbles, financial institutions, global recession, interest rates, liquidity, monetary policy, regulation, stability, supervision.

JEL Codes: E4, E41, E42, E43, E44, E5, E52, E58, F31, F33, F34, F41, F42

Vienna: SUERF (SUERF Studies: 2010/2) – May 2010

ISBN: 978-3-902109-52-1

Table of Contents

List of Authors

Willem H. Buiter
Chief Economist, Citigroup, London

Stefan Gerlach
Professor of Monetary Economics, Institute for Monetary and Financial Stability, University of Frankfurt, and Research Professor, Deutsche Bundesbank, Frankfurt am Main

Clemens J.M. Kool
Professor of Finance and Financial Markets, Utrecht University School of Economics, Utrecht

José Viñals
Financial Counsellor and Director, Monetary and Capital Markets Department, International Monetary Fund, Washington DC

1. INTRODUCTION

Morten Balling, Jan Marc Berk and Marc-Olivier Strauss-Kahn

On September 3-4, 2009 SUERF and Utrecht University School of Economics organized the Colloquium *The Quest for Stability* in Utrecht the Netherlands. The papers included in this SUERF Study are based on contributions to the Colloquium.

Chapter 2, "On Monetary and Financial Stability – Past, Present and Future" is based on the Robert Marjolin Lecture by *José Viñals,* Financial Counsellor and Director, Monetary and Capital Markets Department, IMF. Since the summer of 2007, the world has switched from highly favourable macroeconomic and financial conditions to extreme financial turbulence and global recession. In 2007, according to the speaker, most observers were happy with what we had. Inflation was low and stable and few questioned the independence of central banks. We thought we had achieved financial stability. Monetary policy had clear objectives. There was very little debate on financial stability instruments. Then the crisis came. It shattered the belief that we had achieved financial stability. It turned out that micro prudential supervision had its shortcomings was bad and that macro prudential supervision was missing. Liquidity risks were not paid attention to. Monetary policy was not the cause of the crisis but a facilitating factor. We are still in a crisis so monetary conditions should be kept easy, according to Viñals. Central bank balance sheets, however, have to be reduced. This should be done in a way that does not impair the independence of central banks. The increase in government debt means higher debt service in the future. Fiscal consolidation is absolutely indispensable. Excessive cyclicality in the financial sector should be reduced. Rules and discretion should be combined. We must ensure that systemic important institutions build up contingency reserves in good times so that they can carry losses in bad times. Supervisory systems should be enforced.

Chapter 3 is "Reversing unconventional monetary policy: technical and political considerations" by *Willem H. Buiter,* Professor of Political Economy, London School of Economics and Political Science. Monetary policy during normal times, when markets are orderly and systematically important clusters or networks of banks and other financial institutions are solvent, is not particularly complicated from a technical perspective. In crisis times things become more difficult. The author criticizes the central banks' handling of recent crisis packages to the financial sector in rather strong words. The monetary authorities are loosing sight of their inflation targeting policy. When central banks show too much largesse in supporting financial institutions in difficulties, they indirectly assume powers

with implications for the government budget. Some of the crisis packages imply in fact that tax payers are forced to pay subsidies to the financial industry. The author presents a stylised central bank balance sheet in which the present value of taxes paid by the central bank to the Treasury is included as an important liability. The Federal Reserve System and to some extent Bank of England have during the crisis taken massive risks by buying securities issued by the private sector or accepting such securities as collateral. The benchmark for a central bank should be a "Treasuries only" policy of balance sheet and liquidity management. It should only buy Treasury securities and only accept such securities as collateral. In emergency situations the form but not the substance of the "Treasuries only" policy can be relaxed. When private securities are bought, the Treasury should provide the central bank with full indemnity for them. That is the right way to separate fiscal policy from monetary and liquidity policy. During the exit from unconventional monetary policy, the true extent of the central bank's quasi-fiscal activities during the crisis is likely to be revealed. Central banks should understand that they do not have a redistribution mandate.

Chapter 4 is "Asset Prices and Monetary Policy: Some Sceptical Observations" by *Stefan Gerlach*, Institute for Monetary and Financial Stability, University of Frankfurt and Deutsche Bundesbank. The author first gives a review of the role monetary policy played in the run-up to the 2007-2009 crisis. Then, he reviews the two polar positions in the debate about asset prices and monetary policy: the traditional view that says that central banks shall focus solely on inflation in setting interest rates, and the activist view that holds that interest rates should help prevent the development of financial imbalances. A leaning against the wind policy depends on the information content of a number of indicators of financial imbalances. Since this content is negligible, the author finds that a leaning-against-the-wind policy may exacerbate macroeconomic fluctuations. The notion that discretionary monetary policy can be used to prevent future episodes of financial bubbles emerging therefore seems excessively optimistic. Overall it appears more appropriate to focus on regulation and supervision in seeking to maintain financial stability. Only if these tools are seen to be ineffectual does it seem desirable to consider using monetary policy measures.

Chapter 5 is "The Sustainability of Global Financial Imbalances" by *Clemens J.M. Kool,* Dean of the Economic Faculty, Utrecht University School of Economics. The author provides evidence on the development of gross and net asset positions for a group of 23 developed countries over the period 1960-2008. Both gross asset and liability positions and net foreign asset positions have increased tremendously for most developed countries, especially since the early 1990s. The global financial system has increasingly accommodated the build-up of large imbalances, but these imbalances are now a threat to the stability of the system itself. The evidence shows that not only current account volatility has increased

considerably over time but also that absolute levels and volatility of the net stocks of foreign assets and liabilities have increased strongly. The signs of the imbalances have been very persistent. Deficit countries continue to be deficit countries. Iceland, Ireland, Spain, Portugal, Greece, Australia and New Zealand are classified as persistent deficit countries. Switzerland, Norway, Belgium and China belong to the group of persistent surplus countries. The question is for how long such imbalances are sustainable. For some countries, real exchange adjustments would potentially contribute to solving the problems of imbalances. The author finds, however, that the strength and reliability of the real exchange rate mechanism is weak and inconclusive. For small deficit countries in the euro area, exchange rate adjustment is not an option. In these countries, dramatic domestic macro policies are required. In the view of the author, the issue of global imbalances is underrated in research and policy discussions. In his concluding remarks, he discusses how the IMF could play a useful role by providing uniform risk indicators with respect to the size and sustainability of countries' external positions periodically and provide a relative ranking of all countries. A stronger role for the IMF could also be based on a system where each country was required to deposit an interest-free amount determined by the size of their external imbalances and denominated in SDR in the IMF. The essential objective should be to put a brake on an excessive build up of gross foreign liabilities.

2. On Monetary And Financial Stability – Past, Present And Future

José Viñals[1]

2.1. Introduction

Let me start by saying that it is both an honor and privilege to be here today to give the Marjolin Lecture on the very timely topic of this conference, and to follow in a long line of highly distinguished speakers. As the title of my speech suggests, I will focus on the interplay between monetary and financial stability.

Since the summer of 2007 the world has switched from highly favorable macroeconomic and financial conditions to extreme financial turbulence and global recession. The sequence of rather extreme events that we have witnessed in the past two years provides a unique learning opportunity for us all, and it is from this crucible that we can draw broader lessons on the effectiveness of the policy framework in attaining monetary and financial stability, both domestically and globally.

In my talk I will first throw a spotlight on conditions before the crisis. These appeared to be consistent with both monetary and financial stability in what has been termed the "golden age" of central banking. I will then cover the challenges that were brought on for both monetary and financial stability through the crisis. Finally, I will offer some reflections on how policy frameworks could be enhanced in the future to achieve both monetary and financial stability in a lasting manner, which are necessary for sustained economic growth.

2.2. The Past (before the crisis) – what we thought went right

It seems a long time ago, but let us recall that before the crisis we were happy: we thought we had both monetary and financial stability.

[1] Robert Marjolin Lecture, delivered at the 28th SUERF Colloquium on "The Quest for Stability", 4 September, 2009 at the Utrecht University School of Economics, The Netherlands.

2.2.1. Monetary stability: achieved through better policy frameworks

Since the late 1980s there had been a substantial decline in inflation across the industrialized world and beyond. Many countries saw inflation fall into the low single digits. Moreover, inflation rates became increasingly stable and less dispersed across countries. Non-monetary factors, such as globalization, surely played a role in bringing down inflation, but more important were changes to the monetary policy framework.

There are three key aspects here, which I want to recall because at present they are again being discussed.

The first was the introduction of central bank independence. Many, if not most advanced countries enshrined in law the central bank's independent conduct of monetary policy. Even in countries where no formal change in legislation took place, such as in the United States, it became generally accepted that political considerations should not interfere with monetary policy.

The second was enshrining price stability as a formal and overriding monetary policy objective. Before the breakdown of the Bretton Woods regime exchange rate pegs had provided a nominal anchor. Since the late 1980s nominal anchors were reinstated in the form of explicit and well-articulated price stability objectives.

A third element was fiscal consolidation and the general improvement in the macroeconomic policy framework in many countries, which provided the basis for monetary independence. This was coupled with fiscal reforms and restrictions, in some countries, on central banks' ability to purchase public debt and lend to the government[2]. These provisions bolstered central banks' independence and reduced the risk that pressure is put on the central bank to monetize public debt.

While the reforms I have just outlined refer to the institutional framework for monetary policy, there were also important advances in the strategic framework. While the strategies of major central banks (like the Federal Reserve (Fed), European Central Bank (ECB) or Bank of England) differed formally, they all emphasized constrained discretion. And the same development happened in many emerging markets, which formally shifted to inflation targeting.

[2] These restrictions are often not very hard. For example, in the EU central banks can buy government paper "for monetary policy purposes". Elsewhere, such as in the US and Japan, there are no legal restrictions, and the central bank has the practice to hold Treasuries against cash in circulation.

2.2.2. Financial stability: also "somehow" achieved

We also thought we had "somehow" achieved financial stability. By and large, the period since the late 1990s was characterized by decreasing macroeconomic volatility globally. The perception of low risk translated into lower volatility in financial markets and led many to believe that financial stability had also been achieved in a durable manner.

Financial innovation was thought to have led to a beneficial dispersion of risk through increasingly sophisticated financial instruments, even though this belief was not underpinned by hard evidence.

In turn, financial regulation increasingly relied on private sector inputs (Basel II) and self-regulation, reflecting a belief that private actors knew best how to manage risk.

On the other hand, we need to recall that financial stability frameworks were not as developed as monetary policy frameworks.

Relative to monetary stability frameworks, financial stability frameworks were seen as lacking a clear operational objective, as even the definition of financial stability remained a subject of debate. Financial stability policies relied on much looser conceptual frameworks where the relationships between goals and instruments were much less precise.

There was also recognition that financial stability analysis needed better data. While aggregate data were available at a sufficiently high frequency for monetary policy purposes, these data were not fit for financial stability analysis, and authorities needed to rely on survey data and public accounts – available at best at a 3 month frequency – or alternatively to turn to market data.

While after much debate the policy rate was accepted as the key instrument to conduct monetary policy, there was limited debate on the range of instruments needed to achieve financial stability. Almost by default the discussion centered on capital requirements and their refinements, an area where the 1988 Basel accord had delivered a useful precedent in international cooperation.

Finally, while monetary policy was embodied within a clear institutional framework (central bank independence and price stability), there was no agreement on which institutional framework was best for achieving financial stability. Some countries continued to have a fragmented regulatory and supervisory structure, others developed integrated supervisors or twin-peaks models, while some reduced the role of the central bank in supervision and regulation.

2.3. THE PRESENT (THE CRISIS) – WHAT WENT WRONG?

The crisis shattered the belief that we had "somehow" achieved financial stability. What went wrong? Was monetary policy a factor in causing the crisis? Was financial policy a factor? And while financial stability was clearly gone during the crisis, was monetary stability kept? Let me discuss these questions in turn.

2.3.1. What went wrong?

In my view, there were four main sources of fragility, and I will only mention them briefly, as there have been many excellent discussions on the causes of the crisis. The main underlying factors were increased leverage, increased maturity transformation, increased exposure to aggregate "tail-risk", and lack of transparency. The overextension of risk combined with a lack of transparency to create uncertainty about counterparty exposures, which in turn led to runs on wholesale funding, failures and near-failures of individually systemic institutions and a near breakdown of the global financial system.

But what role did financial and monetary policies play in laying the ground-work for the crisis.

2.3.2. Were financial policies a factor in generating the crisis?

The answer is "Clearly yes". Although it is the financial institutions who are mainly to blame for having taken the decisions that ultimately led to the crisis, this was made possible by the inadequacy of regulatory and supervisory frameworks along several key dimensions.

First, there were enormous failures in the regulation of the most regulated financial intermediaries. Many of the largest banks had become vulnerable to funding crises through an enormous increase in total leverage, funded in wholesale markets. For too long, sufficiently stringent capital standards that could have prevented the build-up of leverage in the system had been missing. And while Basel II was being developed, it focused on ever more sophisticated risk weights for credit risks in the banking book, and paid insufficient attention to liquidity risk and credit risks outside the banking book.

Second, supervision based on existing rules had been weak. While supervisors were waiting for Basel II to be introduced, many of them took their eyes off the ball. For example, a well-known deficiency of Basel I was that it applied a zero risk weight to contingent exposures of less than one year in maturity. This was

exploited by banks in structuring support for the special purpose vehicles they created off-balance sheet. Supervisors needed to have applied higher capital charges on these exposures or forced the banks to consolidate the vehicles. In addition, in the absence of internationally agreed rules on liquidity, national supervisors left unquestioned business models that relied increasingly on the continued liquidity of wholesale funding markets. More active use of supervisory discretion would have required a more thorough assessment of risks, thorough off-site and on-site examinations, and the determination to take follow-up action as needed.

Third, and most important, there had been a lack of a macro-prudential perspective in financial policies. Policies lacked a system view and failed to address increasing within- and cross-sector linkages in financial markets. There was a failure to appreciate that policies that seek to ensure the stability of a single institution may on occasion have adverse consequences for the economy as a whole, for example when they result in a reduction of funding for the economy at large (procyclicality).

And fourth, no one was looking to see if the domestic financial stability policies and the macro perspectives were adding up globally. Were global prudential and global macro policies consistent to produce global financial stability? Clearly not.

2.3.3. Was monetary policy a factor in generating the crisis?

Was it a main factor? My answer is: "No". Was it a facilitating factor? I believe the answer is: "Probably yes at the global level". Specifically, low nominal interest rates and stable economic conditions led to a search for yield by investors and financial institutions globally. This led to increased demand for complex structured products (particularly mortgage-based assets), promoted carry trades (or exposures to high yielding assets funded in low yielding currencies), and through exchange rate pegs created conditions of excess liquidity globally. This facilitated a build-up of leverage, and in turn increased the vulnerability to a reversal of stable macroeconomic conditions.

Overall, my impression is that many central banks did not pay enough attention to the consequences of monetary policy for financial sector developments, both domestically and globally, showing up the lack of a macro-prudential perspective in monetary policymaking. This added to the already mentioned problems coming from a lack of macro-prudential perspective in financial policy.

2.3.4. Was monetary stability kept during the crisis?

One aspect that I think is worth emphasizing is the very different course taken by monetary and financial stability during the crisis. While financial stability was clearly gone, monetary stability appears to have been kept, overall, in the sense that inflation expectations have remained stable and close to inflation objectives across advanced economies.

But the crisis has also complicated monetary policymaking in a number of important ways.

Throughout the crisis the monetary transmission mechanism was affected. Since the unwinding of financial imbalances created enormous demand for precautionary liquidity and put in doubt the solvency of counterparties in money markets, unsecured interbank money markets dried up and term spreads remained elevated, despite significant cuts in policy rates.

The increases in commodity prices between the fall of 2007 and the summer of 2008 resulted in substantial increases in inflation pressures, prompting some central banks to increase rates in the midst of the crisis. This highlights the tension between the need to ensure that inflation expectations remain well-anchored and the need to counter adverse macro-financial feedback loops. In the event, the threat of stagflation subsided quickly, as commodity prices fell sharply from the second half of 2008.

Since then, and consistent with the absence of inflationary risks, monetary policies have helped to support the financial sector and sustain aggregate demand, with policy rates cut to record low levels and central banks expanding their balance sheets, through both quantitative easing (QE) and credit easing (CE). However, with financial sector balance sheets continuing to be weak, monetary policy continues to be less effective, as the pass-through of policy rates to credit extended by the financial sector (the bank lending channel) is diminished.

2.4. THE FUTURE (AFTER THE CRISIS) – CAN MONETARY STABILITY BE KEPT? CAN FINANCIAL STABILITY BE REGAINED?

Looking forward, there are a number of challenges that need to be considered. In the shorter-term, can monetary stability be kept as we transition out of the phase of extraordinary public support provided during the crisis? And in the medium-term, what changes are needed in the macro-financial policy framework in order to secure both monetary and financial stability? Let me take these issues in turn.

2.4.1. Short-term challenges

There are several challenges confronting monetary policymakers after the unprecedented support from low interest rates and unconventional measures, and associated increases in the balance sheets of major central banks.

While monetary policy will have to remain accommodative for some time, a first challenge is removing the monetary stimulus provided by low interest rates as economic and financial conditions improve, so as to keep inflationary expectations anchored. Although the difficulties of getting the timing of interest rate increases right should not be underestimated, this seems a rather manageable task if the main reason behind future price pressures is the recovery of demand. A more difficult situation could arise if there remains economic and financial weaknesses but inflationary pressures come to life as a result of substantial increases in commodity prices due, for example, to unfavorable supply developments. This would be similar to the challenges faced by some central banks in the early phase of the present crisis until the fall of 2008.

A second and less easy challenge is bringing back central bank balance sheets towards more reasonable levels so as to avoid the risk of future losses resulting from the "unconventional" assets accumulated during the crisis. These losses could even affect the financial independence of some central banks. The unwinding of unconventional policy measures is easier and more automatic in those cases – like the ECB – where the central bank has operated within the existing implementation policy framework. In other cases, the accumulation of riskier assets with longer maturities – like in the Fed – makes it more complex to reduce the size of the central bank balance sheet. It is thus of paramount importance that measures be taken in these cases so as to protect the integrity of central banks' balance sheets.

Preserving central bank independence in all of its dimensions is most important at the present time where governments have accumulated very substantial amounts of public debt during the crisis, which is likely to imply heavy debt servicing costs going forward. Debt to GDP ratios are projected to rise to average well over 100 percent of GDP by 2014, up from 75 percent in 2007. Given this unprecedented debt accumulation, strong central bank independence is most needed to avoid any temptations to lean on the central bank to keep refinancing costs low and lower debt burdens through inflation.

Sustaining a political consensus in favor of low inflation requires a forceful reminder that high inflation is very costly to bring down. Moreover, if higher inflation expectations were to take hold, providers of credit are sure to immediately price these into nominal rates, increasing the cost for debtors to roll-over existing debt and obtain new funding. Indeed, once a firm nominal anchor is lost,

the risk of further increases in inflation will be reflected in risk premia, further pushing up long-term rates. This is sure to create a long-lasting drag on growth and will increase rather than ease fiscal pressures.

Instead, on the fiscal side, credible fiscal adjustment is needed once the recovery is underway to offset key sources of spending pressure over the next decades, such as health care and pensions. To buttress fiscal adjustment, institutional arrangements, such as medium term fiscal frameworks, should be strengthened.

2.4.2. Medium-term challenges

Going to the medium-term, the main challenge is to enhance the macro-financial policy framework so as to deliver both monetary and financial stability in a lasting manner. As the crisis has shown, it is financial stability that was badly broken and thus needs to be fixed. The next question is how can this be done, and what role can central banks play in this regard.

To anticipate the conclusions, let me just state the following:

- the first best is for monetary policy and financial policy to be geared to preserving price and financial stability respectively. Thus the main measures to restoring financial stability must come from the enhancement of the regulatory and supervisory framework;
- while monetary policy should remain geared towards delivering price stability, recent experience shows that it should take better account of macro-financial linkages, and particularly of how its interest rate decisions have consequences for price stability through its impact on financial stability. In principle, regulation and supervision should fully take care of financial stability concerns; however, in practice – in a second best world – this may be difficult. Consequently, central banks ought to more fully consider the risk of financial imbalances when setting interest rates, which may lead them to "lean" more against these imbalances in good times and "clean" less in bad times, thus making monetary policy more symmetric over the business cycle. similarly, the regulatory and supervisory framework should take better account of the systemic consequences of financial policies, and thus include a more macro-prudential perspective.

Let me develop these two ideas in what follows.

2.4.3. Regulation and supervision

For the financial and regulatory framework, there are five areas that should be on top of the reform agenda for regaining financial stability:

- increasing the quantity and quality of capital and liquidity in the banking system;

- expanding the regulatory perimeter to cover all systemically important institutions, markets, and activities;
- dealing with excessive procyclicality in the financial system;
- improving financial disclosure;
- ensuring more effective cross-border regulation, supervision, and resolution of systemically important institutions like those too big to fail.

Let me look at each in turn.

The crisis has clearly demonstrated the potential macroeconomic consequences of insufficient capital and liquidity buffers. It is clear that we need a gradual increase in both the level and the quality of regulatory capital in the banking system. To me, requiring banks to hold more high quality capital is a sine qua non for the future.

A closely related issue is the need to promote the holding of more robust liquidity buffers in the system. So far, many had bought into the idea that monitoring liquidity risk was sufficient prudence and that temporary asset illiquidity could be substituted by funding liquidity. Now, there is greater realization that holding a buffer of liquid assets provides a strong shock absorber and can provide useful insurance against funding liquidity shocks.

Regarding the second question, the expansion of the perimeter of financial sector regulation and oversight, reliance on market discipline proved to be ineffective in constraining risk taking outside the banking sector. Supervision, too, was unable to get a complete picture of the exposure of regulated institutions to less regulated institutions and products. The failure of several nonbank financial institutions, which disrupted key financial markets, had systemic repercussions. Hence, increasing the likelihood that the systemic risks posed by unregulated or less-regulated financial sector segments are identified and addressed alongside risks in the regulated sector will be a key step towards ensuring financial stability. We should also acknowledge that there were clearly many instances in which the supervision of even regulated financial institutions (like deposit taking banks) was inadequate. Therefore, as we expand the perimeter of regulation, this must be accompanied by more effective implementation of rules. Not just good rules, they have to be applied effectively.

The third area for reform is addressing excess procyclicality in the financial system, which aggravated the macroeconomic impact of the current crisis by both promoting very rapid asset price increases and credit growth when the economies were booming, and then severely restricting credit and leading to sharply falling asset prices when economies faced a down turn. In addressing procyclicality in the norms governing capital, provisions, liquidity, and incentives in general, regulators will need to balance carefully the trade-offs between rules and discretion. There is work underway in the standard-setting bodies to develop appropriate

countercyclical standards, such as capital requirements and through-the-cycle provisioning, which I think are highly desirable.

Promoting more effective disclosure is the fourth area for reform. Disclosure is important for market discipline, but we also need to ensure that disclosed information is both accurate and informative. Requiring financial institutions to provide massive amounts of information can be just as ineffective as too little. Therefore, a concerted and consistent approach to disclosure on a global basis would strengthen market discipline, as would be the development of a common database of comparable financial statistics for all globally active banks.

I now come to the final question, which is also the one that requires the hardest effort.

This has two aspects: first, how should we deal with systemically important institutions which are viewed as too-big or too interconnected to fail; and second, how should we deal with the cross-border dimensions of their life and death – *i.e.* ongoing operations and failure resolution.

While there is broad agreement on the undesirable moral hazard issues that very large systemic institutions pose, there is less agreement on how they should be dealt with both in preventing crises and in their resolution. I believe that it is time that public policy took a more active stance in discouraging institutions from reaching such a hallowed status in future, but I also believe that this is an issue that has to be handled very carefully and gradually. As a first step, I would agree on greater use of preventive measures such as higher capital and liquidity requirements related to their contribution to systemic risk and more intensive supervision.

The cross-border dimension presents even more difficult terrain. Addressing this inadequacy will require actions on two fronts – coordinating preventive supervision and crisis management arrangements. On supervision, first steps have already been taken by the establishment of supervisory colleges for the large international banks. On the second front, some progress has been made in promoting international consistency in approaches to deposit insurance. However, the Achilles heel of cross border arrangements remains the lack of agreement on insolvency frameworks and resolution arrangements. While the need for greater compatibility in cross-border resolution frameworks has been recognized for many years, with this crisis, the time has come for concrete action. I recognize that such frameworks are integral parts of national regulatory and legal traditions, so advancing in this area will require strong political will.

I find it very encouraging that actions are being taken on all these fronts by the standard setters, guided by the G-20 and the Financial Stability Board. The evolving macroprudential approach which aims to bridge the gaps in addressing sys-

temic and cyclical aspects of regulation covers many of the areas that I have highlighted. In implementing this approach, both supervisory agencies and central banks, where they are separate, must develop frameworks for working better together, and sharing critical information and analysis. There are significant challenges to be met before a true macroprudential approach can be made operational consistently across countries, but nevertheless it will be a significant addition to the regulatory arsenal to combat future crises.

However, as we have learnt time and time again, having the right rules and tools in place is no guarantee that they will be used effectively. One of the key lessons of the crisis is that supervisors and regulators were not as effective as they should have been in identifying risks and acting on them even under the existing standards and with their current set of tools. In short, implementation was lacking.

Effective application of rules requires a strengthening of the ability and accountability of regulatory and supervisory agencies to undertake timely and credible action. The supervisory response to the vulnerabilities that emerged ahead of the present crisis varied widely. In some countries supervisors used existing regulations to require banks to hold capital against a range of risks (like off-balance sheet structures such as SIVs or conduits), effectively reining in the build-up of risky exposures. But in many jurisdictions, supervisors faced impediments to enforcing fully all supervisory regulations.

So, we must find ways to promote the required operational independence of supervisory agencies, their ability to hire and retain skilled supervisors, and their capacity to take corrective actions.

2.4.4. Monetary policy

From my examinations of the needed changes in the framework for regulation and supervision it is clear that financial policies should not just enhance their micro-prudential dimension but add a much needed macro-prudential dimension that adequately integrates system-wide considerations. This is very important also as concerns the linkages between monetary and financial policies.

Specifically, financial policies must take into account the systemic consequences of monetary policy actions such as, for example, the higher risk taking and increased leverage resulting from a period of low interest rates in a low inflation environment, like the one that preceded the current crisis. This macro-prudential focus would help contain the financial imbalances and the systemic risks that otherwise may arise, thus preventing the onset of a financial crisis or, at least, reducing its impact.

Similarly when setting monetary policy, the central bank should take financial stability considerations more fully into account and also bear in mind that its interest rate decisions have consequences for its ultimate goal of price stability through its impact on financial stability.

Consequently, central banks ought to fully consider the risk of financial imbalances when setting interest rates, which also requires that they receive adequate information from the supervisory authorities concerning the state of the financial system. This does not mean that they should target any specific asset price level, but rather that they should be more willing than in the past to lean non-mechanistically against large increases in credit and indebtedness (*e.g.* leverage).

This can be justified as a "pragmatic" adjustment to traditional monetary policy so as to better take into account the sort of financial interactions that the current crisis has brought out very clearly but which are only imperfectly incorporated into the models and structures guiding monetary policy decisions. While somewhat higher interest rates than otherwise may lead to somewhat lower inflation than desired say, next year, they may lower the risks of an eruption of financial instability and deflation later on, and thus help maintain price stability over the medium term. Consequently, this would not involve adding another objective or lessening the role of price stability as the primary goal of monetary policy, but merely ensure that the latter is more effectively pursued over the medium term.

Let me be very clear in reiterating that financial stability should be the primary responsibility of financial policies and that little would be gained on this front if the regulatory framework is not enhanced as it should. But if the adequate reforms come through, monetary policy can also be supportive by incorporating a macro-prudential dimension in its pursuit of price stability.

There are clearly a number of difficult issues involved in putting these suggestions into practice with regard to monetary policy. For instance, it is important to make sure that the lengthening of the time horizon to achieve price stability is accompanied by a reconsideration of the framework for monitoring central bank performance relative to its objectives. If the operational horizon is extended, it may become more difficult to judge the performance of the central bank, and so it may be necessary to rely more on variables such as the stability of inflation expectations.

Also, there may be different ways of achieving the same purpose. As a number of European central bankers have noted, the monetary pillar of the European Central Bank's monetary policy strategy can be used in a way that helps to conduct monetary policy in a more symmetric manner over the cycle, and more fully take into account financial stability considerations in the monetary policy making process. The monetary pillar puts a special emphasis on the evaluation of mone-

tary and credit developments, with the aim of detecting medium-term inflation risks. But this is just one particular approach and other models are possible. As practitioners and academics, we need more research and debate to develop these ideas further before we adopt reforms.

2.5. CONCLUSIONS

I would like to conclude by painting a picture of the idealized macro-policy framework of the future. We may never get there, but it should be the goal. In this world fiscal policy becomes truly countercyclical by accumulating high enough surpluses in good times that can be drawn from in bad times; financial policy mitigates excessive procyclicality by accumulating cushions in good times that can be used in bad times; and monetary policy pays more attention to financial imbalances by "leaning" more against them in good times and thus having less of a need for "cleaning" after they explode in bad times. In my view, such a framework can significantly contribute to sustained growth around a more stable path by better grounding macro-economic stability, and it is an ideal that we should keep in mind as we undertake the necessary reforms in the years ahead.

In closing, I hope that all the efforts that are being undertaken to find solutions to preventing future crises from having such devastating effects will bear fruit. I am heartened by the renewed vigor in national efforts towards international collaboration and coordination, which are the most essential ingredients in the recipe for stability in an interconnected world. Still, we must together enlist the support of all stakeholders to counter the emerging forces of pushback and complacency – the two factors most likely to derail the reform agenda so instrumental to our pursuit of future financial stability. Otherwise, our efforts will be like that of the mythical Sisyphus, and in every future crisis we will once again begin our uphill task of pushing the heavy agenda of major regulatory reform.

3. Reversing unconventional monetary policy: technical and political considerations

Willem H. Buiter

Abstract

There are few if any technical problems involved in reversing the unconventional monetary policies – quantitative easing, credit easing and enhanced credit support – implemented by central banks around the world as short-term nominal interest rates became constrained by the zero lower bound.

The two main obstacles to an early and easy exit from unconventional monetary policies are political. The first is a potential conflict between the central bank and the fiscal authority about the role of monetary financing in the fiscal-financial-monetary programme of the state. If there is a conflict about the role of seigniorage in closing the government's solvency gap, the likely outcome is a win for the fiscal authority, except in the case of the ECB.

The second political impediment to a prompt and painless exit from unconventional monetary policy is that scaling down the size of the central bank's balance sheet and the scale and scope of its other interventions in financial markets and institutions is likely to reveal the true extent of the central bank's quasi-fiscal activities during the crisis and its aftermath. The large-scale *ex-ante* and *ex-post* quasi-fiscal subsidies handed out by the Fed and to a lesser extent by the other leading central banks, and the sheer magnitude of the redistribution of wealth and income among private agents that the central banks have engaged in could (and in my view should) cause a political storm. Delay in the dropping of the veil is therefore likely.

3.1. Introduction

Monetary policy during normal times, when markets are orderly and systemically important clusters or networks of banks and other financial institutions are solvent, is not particularly complicated from a technical perspective. The appropriate course of behaviour for the central bank during a systemic financial crisis, when systemically important financial institutions are at risk of failing and key financial markets are seizing up is even simpler from a purely technical point of view. Monetary policy at the zero lower bound for short nominal interest rates may not be particularly effective, but it certainly is not technically complicated.

Indeed, the only technical issue associated with monetary policy at the zero lower bound is the need to recognise that, far from being an insurmountable constraint, the zero lower bound is a figment of the (lack of) imagination of the economics profession. Minor changes in the monetary and financial instrumentarium and in central bank operating procedures can remove the zero lower bound completely, thus making the domain of the official policy rate symmetric around zero (see Buiter (2009)).

Likewise, unwinding or reversing unconventional monetary policies that were prompted either by large-scale lender-of-last-resort and market-maker-of-last-resort interventions, and/or by quantitative easing, credit easing or enhanced credit support at the zero lower bound is technically easy.

Assets acquired through repos and similar secured lending operations disappear from the balance sheet as the loans in question (which are mostly at maturities of a year or less) mature and are not renewed. Indeed, the monetary authorities can be largely passive and let the balance sheet compression be demand-determined if, like the ECB, they set the official policy rate (at 1.00 percent currently) and provided unlimited liquidity against suitable collateral for maturities of up to one year at that rate. In the case of the ECB, the €442 bn fixed-rate longer-term refinancing operation (LTRO) of 25-06-2009 was followed by an LTRO of "just" €75 bn on 01-10-2009 (see European Central Bank (2009a))

Assets acquired outright by the central bank, *e.g.* the €45.5 bn of covered bonds purchased by the ECB under a €60 bn facility (European Central Bank (2009a,b)), can be sold at any time in the secondary markets if they are liquid. If they are illiquid, it may take time to arrange a sale at a price anywhere near fair value. At worst, the illiquid assets in question have to be held to maturity. Reverse repo operations – where the central bank borrows from the private sector by selling some of its assets and at the same time making a commitment to repurchase them at a known future date at a price fixed today – are another way for the central bank to drain central bank liquidity from the system. Although reducing the size of the central bank's balance sheet is technically easy, this does not necessarily mean that it will be executed well by the central banks.

But technical considerations are not central concerns when it comes to an unwinding of the unusual monetary policies implemented by the central banks during the past year or so. Three kinds of further obstacles stand it the way of a graceful exit from unconventional monetary policy.

The first obstacle is that an end to quantitative easing and credit easing requires that, collectively, the other actors in the macroeconomic game – the general government (henceforth the Treasury), the domestic private sector and the rest of the world (foreign central banks, other foreign state actors and foreign private

agents) change the composition of their financial asset portfolios to accommodate the planned reduction in the size of the central bank balance sheet. In some countries, the portfolio reshuffling that is the logical, unavoidable counterpart to the reduction in the size of the central bank's balance sheet – reduced holdings of base money by the domestic private sector and the rest of the world and the associated reduction in central bank holdings of domestic private securities, government debt and net foreign assets (including official foreign exchange reserves) – can create serious funding problems, especially for the domestic private sector and the national Treasury.

The problem is aggravated if the reduction in the size of the central bank balance sheet is accompanied by an increase in the financial deficit of the central bank. This is likely to be the case if the interest rates on the assets the central bank holds (which are positive and higher than the current very low official policy rate) remain constant. With a zero nominal interest rate on currency liabilities and a rate equal to or below the official policy rate on bank reserves held with the central bank, a reduction in the size of the balance sheet will reduce the central bank's net interest income and thus increase its financial deficit (reduce its financial surplus). If, however, the reduction in the size of the central bank balance sheet is associated with an increase in the average interest rate on their assets (and it is all but certain that at least short-term nominal rates will be rising as quantitative easing (QE), credit easing (CE) and enhanced credit support (ECS) unwind), the effect of a decision to reduce the size of the central bank balance sheet on the central bank's financial deficit is ambiguous.

If the exit from unconventional monetary policy is associated with an increase in the financial deficit of the central bank, the remaining actors will, in the aggregate, have to reduce their financial deficits. This need not be a problem if it is in the perceived self-interest of these actors to reduce their financial deficits. For the private sector in the US and the UK this is certainly the case today. For the public sector, the obvious need for sharply lower financial deficits in the medium and long term (from a fiscal-financial sustainability perspective) is not matched by any political willingness to implement the necessary public spending cuts or tax increases any time soon.

This first obstacle to a timely balance sheet contraction by the central bank is likely to manifest itself as a conflict between the fiscal authorities and the monetary authorities. The fiscal authorities in a number of countries, including the USA and the UK, are likely to want a slower or more limited contraction in the size of the central bank balance sheet because this would prevent an increased supply of Treasury debt in the market (if the asset side of the central bank balance sheet contraction takes the form of a reduction in its Treasury debt holdings and/or a refusal to add to this stock) or a reduction in the demand for Treasury debt

in the market (if the central bank contracts is balance sheet by reducing its holdings of private securities and the private sector is as a result less willing and able to hold Treasury debt).

A second obstacle to the smooth unwinding of unconventional monetary policy could be the cognitive impairment of key central bankers. Even though the issues are simple, a peculiar professional blindness may prevent one or more of the key central bank governors from fully grasping the issues. A rich and embarrassing series of monetary policy errors, including during the years leading up to the financial crisis that erupted in August 2007 and during the early stages of the crisis, suggests that even monetary policy makers whose conventionally measured intelligence is unbounded from above may exhibit persistent and highly damaging forms of professional blindness. Examples include the sequence of credit- and asset market boom and bubble promoting policy blunders since 2003 by the US monetary authorities and, to a slightly lesser extent, by the Japanese, Euro Area and British monetary authorities; the ECB's decision to raise the official policy rate in July 2008 and the Bank of England's initial blindness to its market-maker-of-last-resort responsibilities as key wholesale financial markets seized up in August and September 2007

The third obstacle to a smooth exit from unconventional monetary policy is political. Reversing the unconventional policies is likely to bring out into the open the extraordinary quasi-fiscal role played by some central banks during this crisis (most notably by the Fed), their usurpation of budgetary powers assigned to the legislative branch of government by constitutions, laws or deeply embedded conventions, and the extraordinary (and unnecessary) financial largesse bestowed by some central banks on a small number of financial institutions and a limited number of stakeholders in these institutions. This "quiet coup" (to borrow the felicitous phrase of Simon Johnson (2009)) by a body of unelected technocrats has political and constitutional consequences that have to be considered fully when a comprehensive evaluation of this episode is attempted[1].

If some central bankers, during the years that led up to the crisis that started in August 2007 and in their lender-of-last-resort and market-maker-of-last-resort operations since August 2007, failed to do the technically appropriate thing, despite the simplicity of the problems they were faced with, this implies that at least one of the following two explanations has to be correct. Either these central bankers were singularly inept and incompetent or there were non-cognitive factors that prevented them from doing the right thing. Either external pressure was

[1] "Quiet Coup" echoes the earlier "Silent Coup" phrase used by Colodny and Gettling (1991) to characterize Watergate and its aftermath. An early attempt to interpret the behaviour of the Fed during the first year of the crisis from the perspective or regulatory capture, and specifically from that of cognitive regulatory capture can be found in Buiter (2008).

brought to bear on them or they knowingly, for reasons of their own which one can only guess at, chose a course of action that was inferior as regards their public mandates, to manifestly available alternatives.

3.2. THE INEXTRICABLE INTERDEPENDENCE AND INTERTWINING OF CENTRAL BANK AND TREASURY

Whatever its legal or de facto degree of operational and goal independence, the central bank is part of the state and subject to the authority of the sovereign. Sometimes central bankers speak and act as if the Principal(s) on whose behalf they act as Agents in a Principal-Agent relationship (or the Beneficiary on whose behalf they act as Trustees in a Fiduciary relationship) is not the state or the sovereign but the wider community or society – the citizens in the domain of the central bank *directly* rather than as filtered through the executive and legislative organs of the state. I don't believe, however, that such a belief rests on a thorough understanding of the power relationship between the central bank and the fiscal authority.

Specifically, the state (through the Treasury) can tax the central bank, even if these taxes may have unusual names. In many countries, the Treasury formally owns the central bank. This is the case, for instance, in the UK, although not in the US and in some Euro Area countries. The ECB is owned by the national central banks (NCBs) of the EU member states; more precisely, the ECB's capital is subscribed by all EU NCBs, but paid up only by the Euro Area NCBs. Subscribed capital of the ECB is €5 billion – a very small amount indeed. The NCBs that own the ECB themselves have a range of formal ownership arrangements, but are ultimately under the financial control of their national fiscal authorities, because the national fiscal authority can always tax the NCB. The Treaty establishing the European Community formally grants the ECB and the NCBs of the Eurosystem some immunity against being raided by national Treasuries, as the ECB has its own budget, and its financial arrangements are kept separate from that of the European Community.

The ability of the ECB and the Eurosystem to resist a raid by the fiscal authorities of the Euro Area, severally or jointly, is not primarily due to the text of the Treaty, which in any case nowhere prevents a national Treasury from taxing a national central bank. If national Treasuries can put a financial squeeze on national central banks, then they can indirectly put the squeeze on the ECB, which is wholly owned by these NCBs. What makes the ECB more independent than any other central bank is the fact that it has 16 national Treasuries as its counterparties rather than a single national Treasury. Should a European fiscal federal authority

ever emerge, the anomaly of the ECB as a *de facto* as well as a *de jure* financially independent central bank would probably come to an end.

Unlike most other state agencies, the central bank can engage in quasi-fiscal actions, that is, actions that are economically equivalent to levying taxes, paying subsidies, or engaging in redistribution of income and wealth. Examples are non-remunerated reserve requirements (or required reserves remunerated at below-market rates, which are a quasi-fiscal tax on banks), loans to the private sector at an interest rate that does not at least cover the central bank's risk-adjusted cost of non-monetary borrowing (a quasi-fiscal subsidy), accepting overvalued collateral (a quasi-fiscal subsidy) or outright purchases of securities at prices above fair value (a quasi-fiscal subsidy).

To determine how the use of the central bank as a quasi-fiscal agent of the state affects its ability to pursue its macroeconomic stability objectives, a little accounting is in order. In what follows, I disaggregate the familiar "government budget constraint" into separate budget constraints for the central bank and the Treasury. I then derive the *intertemporal budget constraints* for the central bank and the Treasury, or their "comprehensive balance sheets". The contrast between the familiar conventional balance sheet of the central bank and its comprehensive balance sheet is highly informative.

My stylised central bank has two financial liabilities: the non-interest-bearing and irredeemable monetary base $M \geq 0$ and its interest-bearing non-monetary liabilities (central bank Bills), $N \geq 0$, paying the risk-free one-period domestic nominal interest rate i[2]. On the asset side it has the stock of international foreign exchange reserves, R^f, earning a risk-free nominal interest rate in terms of foreign currency, i^f, and the stock of domestic credit, which consists of the sum of central bank holdings of nominal, interest-bearing Treasury bills, $D \geq 0$, earning a risk-free domestic-currency nominal interest rate i, and central bank claims on the private sector, $L \geq 0$, with domestic-currency nominal interest rate i^L. The stock of Treasury debt (assumed to be denominated in domestic currency) held outside the central bank is B; it pays the risk-free nominal interest rate i; T^p is the real value of the tax payments by the domestic private sector to the Treasury; it is a choice variable of the Treasury and can be positive or negative; T^b is the real value of taxes paid by the central bank to the Treasury; it is a choice variable of the Treasury and can be positive or negative; a negative value for T^b is a transfer from the Treasury to the central bank – an example would be the resource transfer from the Treasury to the central bank when the Treasury recapitalises the central bank; $T = T^p + T^b$ is the real value of total Treasury tax receipts; P is the domestic general price level; e is the value of the spot nominal exchange rate (the

[2] For descriptive realism, I assume that the nominal interest rate on currency (shorthand in what follows for all of the monetary base) is zero.

domestic currency price of foreign exchange); $C^g \geq 0$ is the real value of Treasury spending on goods and services and $C^b \geq 0$ the real value of central bank spending on goods and services. For expositional ease, public spending on goods and services is assumed to be for consumption only.

Equation (1) is the period budget identity of the Treasury and equation (2) that of the central bank.

$$\frac{B_t + D_t}{P_t} \equiv C_t^g - T_t^p - T_t^b + (1 + i_t)\left(\frac{B_{t-1} + D_{t-1}}{P_t}\right) \tag{1}$$

$$\begin{aligned}\frac{M_t + N_t - D_t - L_t - e_t R_t^f}{P_t} &\equiv C_t^b + T_t^b \\ + \frac{M_{t-1} - (1 + i_t)(D_{t-1} - N_{t-1}) - (1 + i_t^L)L_{t-1} - (1 + i_t^f)e_t R_{t-1}^f}{P_t}\end{aligned} \tag{2}$$

The solvency constraints of, respectively, the Treasury and central bank are given in equations (3) and (4):

$$\lim_{N \to \infty} E_t I_{N,t-1}(B_N + D_N) \leq 0 \tag{3}$$

$$\lim_{N \to \infty} E_t I_{N,t-1}(D_N + L_N + e_N R_N^f - N_N) \geq 0 \tag{4}$$

Here I_{t_1,t_0} is the appropriate, state-contingent nominal stochastic discount factor between periods t_0 and t_1.

These solvency constraints, which rule out Ponzi finance by both the Treasury and the central bank, imply the following intertemporal budget constraints for the Treasury (equation (5)) and the central bank (equation (6)).

$$B_{t-1} + D_{t-1} \leq E_t \sum_{j=t}^{\infty} I_{j,t-1} P_j (T_j^p + T_j^b - C_j^g) \tag{5}$$[3]

$$D_{t-1} + L_{t-1} + e_{t-1} R_{t-1}^f - N_{t-1} \leq E_t \sum_{j=t}^{\infty} I_{j,t-1}(P_j(C_j^b + T_j^b + S_j) - \Delta M_j) \tag{6}$$

where

$$P_j S_j \equiv (i_j - i_j^L)L_{j-1} + \left(1 + i_j - (1 + i_j^f)\frac{e_j}{e_{j-1}}\right)e_{j-1} R_{j-1}^f \tag{7}$$

The expression S in equation (7) stands for the real value of the flow of quasi-fiscal implicit interest subsidies paid by the central bank. If the rate of return on government debt exceeds that on loans to the private sector, there is an implicit

[3] Note that $E_t E_{t-1} I_{t,t-1} = E_{t-1} I_{t,t-1} = \frac{1}{1 + i_t}$.

subsidy to the private sector equal in period t to $(i_t - i_t^L)$. If the rate of return on foreign exchange reserves is less than what would be implied by Uncovered Interest Parity (UIP), there is an implicit subsidy to the issuers of these reserves, given in period t by $\left(1 + i_t - (1 + i_t^f)\frac{e_t}{e_{t-1}}\right)e_{t-1}R_{t-1}^f$.

For future reference, the present discounted values of current and future central bank operating expenses Γ^b, of central bank taxes paid to the Treasury Θ^b, and of central bank quasi-fiscal subsidies paid on its asset portfolio Λ, are given by, respectively,

$$\Gamma_t^b \equiv E_t \sum_{j=t}^{\infty} I_{j,t-1} P_j C_j^b$$

$$\Theta_t^b \equiv E_t \sum_{j=t}^{\infty} I_{j,t-1} P_j T_j^b \tag{8}$$

$$\Lambda_t \equiv E_t \sum_{j=t}^{\infty} I_{j,t-1} P_j S_j$$

When comparing the conventional balance sheet of the central bank to its comprehensive balance sheet or intertemporal budget constraint, it is helpful to rewrite (6) in the following equivalent form:

$$\begin{aligned} &\frac{M_{t-1}}{1+i_t} - (D_{t-1} + L_{t-1} + e_{t-1}R_{t-1}^f - N_{t-1}) \\ &\leq E_t \sum_{j=t}^{\infty} I_{j,t-1}\left[P_j(-C_j^b - T_j^b - S_j) + \left(\frac{i_{j+1}}{1+i_{j+1}}\right)M_j\right] \end{aligned} \tag{9}$$

To get from (6) to (9), we use the identity given in (10) relating two common measures of seigniorage – the resources saved or extracted by the monetary authority through its capacity to issue non-interest-bearing fiat money (base money). Generalisations to the case where base money or some of its components pay interest look very similar (see Buiter (2007)). The first measure of seigniorage is the change in the monetary base, ΔM; the second is the interest saved by being able to issue zero interest-bearing base money rather than securities bearing the risk-free nominal interest rate i, that is, $\left(\frac{i}{1+i}\right)M$.

Let $H_t^1 \equiv E_t \sum_{j=0}^{\infty} I_{t+j,t}\left(\frac{i_{t+j+1,t+j}}{1+i_{t+j+1,t+j}}\right) M_{t+j}$ and $H_t^2 \equiv E_t \sum_{j=1}^{\infty} I_{t+j,t} \Delta M_{t+j}$, then

$$H_t^2 \equiv H_t^1 + E_t \lim_{T \to \infty} I_{t+T+1,t} M_{t+T} - M_{t-1} \tag{10}$$

I also assume that $E_t \lim_{T \to \infty} I_{t+T+1,t} M_{t+T} = 0$.

We can now rewrite the intertemporal budget constraint or comprehensive balance sheet of the central bank more compactly as follows:

$$\left[D_{t-1} + L_{t-1} + e_{t-1} R_{t-1}^f - \left(\frac{M_{t-1}}{1+i_t} + N_{t-1}\right)\right] + [H_t^1 - \Theta_t^b - (\Gamma_t^b + \Lambda_t)] \geq 0 \tag{11}$$

or equivalently:

$$[D_{t-1} + L_{t-1} + e_{t-1} R_{t-1}^f - N_{t-1}] + [H_t^2 - \Theta_t^b - (\Gamma_t^b + \Lambda_t)] \geq 0 \tag{12}$$

Summing (1) and (2) gives the period budget identity of the government (the consolidated Treasury and central bank), in equation (13); summing (3) and (4) gives the solvency constraint of the government in equation (14) and summing (5) and (6) gives the intertemporal budget constraint of the government in equation (15).

$$\begin{aligned} &M_t + N_t + B_t - L_t - e_t R_t^f \equiv P_t(C_t^g + C_t^b - T_t) \\ &+ M_{t-1} + (1+i_t)(B_{t-1} + N_{t-1}) - (1+i_t^L) L_{t-1} - e_t (1+i_t^f) R_{t-1}^f \end{aligned} \tag{13}$$

$$\lim_{N \to \infty} E_t I_{N,t-1} (B_{t-1} + N_N - L_N - e_N R_N^f) \leq 0 \tag{14}$$

$$B_{t-1} + N_{t-1} - (L_{t-1} + e_{t-1} R_{t-1}^f) \leq E_t \sum_{j=t}^{\infty} I_{j,t-1} [P_j(T_j - S_j - (C_j^g + C_j^b)) + \Delta M_j]$$

$$\begin{aligned} &\frac{M_{t-1}}{1+i_t} - B_{t-1} + N_{t-1} - (L_{t-1} + e_{t-1} R_{t-1}^f) \\ &\leq E_t \sum_{j=t}^{\infty} I_{j,t-1} \left[P_j(T_j - S_j - (C_j^g + C_j^b)) + \left(\frac{i_{j+1}}{1+i_{j+1}}\right) M_j\right] \end{aligned} \tag{15}$$

Let Π denote the present discounted value of current and future conventional primary (non-interest) surpluses of the consolidated general government and central bank, that is,

$$\Pi_t \equiv E_t \sum_{j=t}^{\infty} I_{j,t-1} P_j (T_j - (C_j^g + C_j^b)) \tag{16}$$

We can rewrite the intertemporal budget constraint or comprehensive balance sheet of the consolidated general government and central bank as follows:

$$[L_{t-1} + e_{t-1}R^f_{t-1} - (B_{t-1} + N_{t-1})] + [\Pi_t - \Lambda_t + H^1_t] \geq 0$$

or equivalently

$$\left[L_{t-1} + e_{t-1}R^f_{t-1} - \left(B_{t-1} + N_{t-1} + \frac{M_{t-1}}{1+i_t}\right)\right] + [\Pi_t - \Lambda_t + H^1_t] \geq 0$$

Consider the conventional financial balance sheet (at book value) of the Central Bank in Table 1,

Table 1: Central Bank Conventional Financial Balance Sheet

Assets	Liabilities
D	$\frac{M}{1+i}$
L	N
eR^f	
	W^b

The Central Bank's conventional financial net worth or equity, $W^b \equiv D + L + eR^f - N - \frac{M}{1+i}$, is the excess of the value of its financial assets (Treasury debt, D, loans to the private sector, L and foreign exchange reserves, eR^f) over its non-monetary liabilities N and its monetary liabilities $\frac{M}{1+i}$.

The first term on the left-hand side of (11) is the conventionally measured equity of the central bank. The second term on the left-hand side of (11) contains a number of implicit assets (sources of income) and liabilities (commitments) of the central bank that don't appear in the conventional balance sheet. The key implicit asset is H^i_t, the present discounted value of current and future seigniorage (interest saved by the ability to issue non-interest-bearing base money). It is non-negative. The implicit liabilities are Θ^b_t, the present discounted value of future net tax payments by the central bank to the Treasury. This can be either positive or negative. When the central bank gets recapitalised by the Treasury, the resource transfer is from the Treasury to the central bank for at least one period. Another important implicit liability is the present discounted value of the quasi-fiscal subsidies paid by the central bank to its debtors, Λ_t. In more general models this could be negative – the central bank can impose quasi-fiscal taxes, for instance through non-remunerated reserve requirements. In the recent financial crisis, Λ_t

is likely to be a very large number, especially in the US and the Euro Area. The final implicit liability is the present discounted value of the cost of running the central bank, Γ_t^b. It is non-negative.

We can represent the intertemporal budget constraint (11), as a comprehensive balance sheet of the central bank, as in Table 2 below. Comprehensive net worth is denoted $\hat{W}^b$.

Table 2: Central Bank Comprehensive Balance Sheet

Assets	Liabilities
D	$\frac{M}{1+i}$
L	N
eR^f	Γ^b
	Θ^b
H^1	Λ
	$\hat{W}^b$

Even if the conventionally defined net worth or equity of the central bank is negative, that is, if $W_{t-1}^b \equiv D_{t-1} + L_{t-1} + e_{t-1}R_{t-1}^f - N_{t-1} - \frac{M_{t-1}}{1+i_t} < 0$, the central bank can be solvent provided comprehensive central bank net worth, $\hat{W}^c$ is non-negative, that is, provided

$$\hat{W}_{t-1}^b \equiv W_{t-1}^b + H_t^1 - (\Gamma_t^b + \Theta_t^b + \Lambda_t) \geq 0 \tag{17}$$

Conventionally defined financial net worth or equity excludes the present value of anticipated or planned future non-contractual outlays and revenues (the right-hand side of equation (17)). It is therefore perfectly possible for the central bank to survive and thrive with negative financial net worth. If there is a seigniorage Laffer curve, however, there always exists a sufficient negative value for central bank conventional net worth, that would require the central bank to raise so much seigniorage in real terms, $\left\{\frac{\Delta M_j}{P_j}; j \geq t\right\}$, or $\left\{\left(\frac{i_{j+1}}{1+i_{j+1}}\right)M_j; j \geq t\right\}$ through current and future nominal base money issuance, that, given the demand function for real base money, unacceptable rates of inflation would result (see Buiter (2007e, 2008a)).

While the central bank need never go broke (that is, (17) will not be violated unless the central bank wants it to be violated) as long as the financial obligations

imposed on the central bank are domestic-currency denominated and not index-linked, the central bank could go broke if either foreign currency obligations or index-linked obligations were excessive. I will ignore the possibility of central bank default in what follows, but not the risk of excessive inflation being necessary to secure central bank solvency without recapitalisation by the Treasury, if the central bank's conventional balance sheet were to take a sufficiently large hit.

This situation can arise, for instance, if the central bank is used (or volunteers to act as) a quasi-fiscal actor to such an extent that the present discounted value of the quasi-fiscal subsidies it provides, Λ_t, is so large, that its ability to achieve its inflation objectives is impaired. In that case (if we rule out default by the central bank on its own non-monetary obligations, N_{t-1}), the only way to reconcile central bank solvency and the achievement of the inflation objectives would be a recapitalisation of the central bank by the Treasury, that is, a sufficient large increase in $-\Theta_t^b$ [4].

The conventional and comprehensive balance sheets of the general government and central bank are shown in Tables 3 and 4; W^g is the conventional financial net worth of the consolidated general government and central bank; $\hat{W}^g$ is the comprehensive net worth.

Table 3: Comprehensive Financial Balance Sheet
Consolidated general government and central bank

Assets	Liabilities
L	$\frac{M}{1+i}$
	N
eR^f	B
	W^g

Table 3: Conventional Financial Balance Sheet
Consolidated general government and central bank

Assets	Liabilities
L	$\frac{M}{1+i}$
eR^f	N
Π	B
H^1	Λ
	$\hat{W}^g$

[4] Central bank current expenses C^b can at most be cut to zero.

3.3. THE SAME CHICKEN (ALMOST) ALWAYS WINS

The budget constraint interdependence and balance sheet interdependence of the central bank and the Treasury are not symmetric. Virtually everywhere, Sargent's (1986) game of chicken between a central bank wanting to meet its inflation target and a Treasury unwilling or unable to make a credible commitment to raise the present discounted value of its primary surpluses is determined in favour of the Treasury when push comes to shove. In terms of the accounting framework of the previous section, T^b and its present discounted value Θ^b are decided by the Treasury (possibly by the legislature), not by the notionally operationally independent central bank.

The only *prima facie* exception to this rule is the ECB, which is pretty much insulated from political pressures to change T^b and Θ^b in favour of the ECB's shareholders (the national central banks) and through them in favour of the national Treasuries of the EMU member states. As argued in the previous Section, this immunity is bestowed not so much by the letter of the Treaty and Protocols as by the "logic of collective action": a single supranational central bank will be able to hold its own against 16 (let alone 27) national fiscal authorities even when a single national central bank would yield to a single national fiscal authority (see Olson (1965)). This would not, of course, reverse the game of chicken by making the monetary authority the dominant player – but neither player has the capacity to tax the other, which is effectively equivalent to telling it what to do. There would be a stalemate.

I believe that this *prima facie* extraordinary degree of independence of the ECB, including its capacity to resist raids on its resources, is unlikely to survive a true test. The (input) legitimacy bestowed on the ECB through the Treaty is unlikely to be sufficient for it to be able to resist for long the more urgent claims to legitimacy of elected national and supranational authorities. Central banks are likely to submit to the sovereign, when all is said and done. The multimorphous nature of sovereignty in the EU and EMU has provided the ECB with an unprecedented degree of independence. I conjecture that unless the ECB achieves a much greater degree of output legitimacy than it has thus far, it too will end up on the losing side of the game of chicken between the fiscal and monetary authorities, possibly even before a supranational fiscal authority is established for the EU[5].

If the central bank's desire to reduce the size of its balance sheet (and possibly to run smaller financial surpluses) is incompatible with the fiscal objectives of the Treasury, then the unwinding of the unconventional monetary policies could be

[5] According to Schimmelfennig (1996), "The principle of input legitimacy claims that a democratic system of rule achieves its legitimacy by the way decisions are made (and not by the results these decisions produce)" and "The output legitimacy of a political system depends on its capacity to achieve the citizen´s goals and solve their problems effectively and efficiently. The higher this capacity, the more legitimate the system."

delayed for years, because the Treasury would prevent the central bank from reducing the size of its balance sheet and from raising the official policy rate in the manner preferred by a politically unconstrained central bank. In the US such restrictions on the freedom of action of the central bank would not require any formal changes to the monetary policy framework, although it may require some changes in the composition of the memberships of the Federal Reserve Board and the FOMC. There is ample precedent (outside the US) for countries increasing the size of the monetary policy making body, or changing nomination and/or appointment procedures for membership of the monetary policy making body, to pack it with loyal administration hacks.

In the UK, the government could, if the central bank's desired pace of monetary policy normalisation were faster than that of the government, invoke the Reserve Powers of the Bank of England Act which permits the Chancellor of the Exchequer to repatriate the rate setting powers and other monetary policy competencies currently exercised by the Monetary Policy Committee and the Bank of England. This would not even require a Parliamentary vote *ex-ante*[6].

For a variety of legal and historical reasons, the degree of independence of the Fed from the Administration and from the Congress is lower than that of the Bank of England from the executive and Parliament. The degree of independence of the ECB from national and EU-level executive and legislative authorities is higher yet, although not as high as the letter of the Treaty would suggest. It is therefore likely that for a given *solvency gap* (calculated for existing plans and projections for general government primary surpluses and given the central bank's inflation target) the pressure to fill this gap through inflation rather than through higher primary surpluses (public spending cuts and tax increases) is likely to be stronger in the US than in the UK and the EMU (in that order). It is when some national governments in the EMU will be faced with an unmoving ECB and the choice between sovereign debt default and some combination of deep public spending cuts and steep tax increases, that we will have the first true test of ECB independence.

[6] The relevant sections of the *Bank of England Act 1998* read as follows:
Treasury's reserve powers
19 Reserve powers
(1) The Treasury, after consultation with the Governor of the Bank, may by order give the Bank directions with respect to monetary policy if they are satisfied that the directions are required in the public interest and by extreme economic circumstances;
(2) An order under this section may include such consequential modifications of the provisions of this Part relating to the Monetary Policy Committee as the Treasury think fit;
(3) A statutory instrument containing an order under this section shall be laid before Parliament after being made;
(4) Unless an order under this section is approved by resolution of each House of Parliament before the end of the period of 28 days beginning with the day on which it is made, it shall cease to have effect at the end of that period.

3.4. SHOULD CENTRAL BANKS BE QUASI-FISCAL ACTORS?

There are in my view two reasons why the Fed, or any other central bank, should not act as a quasi-fiscal branch of the government, other than paying to the Treasury in taxes, T^b, the profits it makes in the pursuit of its mandated macroeconomic stability objectives (maximum employment, stable prices and moderate long-term interest rates in the case of the Fed) and its *appropriate* financial stability objectives. The appropriate financial stability objectives of the central bank are those that involve providing liquidity, at a cost covering the central bank's opportunity cost of non-monetary financing, to illiquid but solvent financial institutions.

Any action going beyond that, such as the recapitalisation of insolvent banks through quasi-fiscal subsidies, ought to be funded by the Treasury. The central bank should be involved only as an agent of the Treasury – an expert assistant. It should not put its own conventional or comprehensive balance sheet at risk.

The two arguments against the central bank acting as a quasi-fiscal agent are, first, that acting as a quasi-fiscal agent may impair the central bank's ability to fulfill its macroeconomic stability mandate and, second, that it obscures responsibility and impedes accountability for what are in substance fiscal transfers. In the US such actions subvert the *Constitution*, which clearly states in Section 8, Clause 1, that the power to tax and spend rests with the Congress: *"The Congress shall have Power to lay and collect Taxes, Duties, Imposts and Excises, to pay the Debts and provide for the common Defence and general Welfare of the United States; but all Duties, Imposts and Excises shall be uniform throughout the United States."*.

If, as happened in the USA on a vast scale, the central bank allows itself to be used as an off-budget and off-balance-sheet special purpose vehicle of the Treasury, and refuses to provide to the Congress some of the information essential for the quantification of the fiscal transfers it has made, the central bank not only subverts the constitution. By attempting to hide contingent commitments and to disguise *de-facto* subsidies by not divulging relevant information on the terms on which the central bank has offered financial assistance, it undermines its own independence and legitimacy and impairs political accountability for the use of public funds – "tax payers' money". It is surprising that a country whose creation folklore attributes considerable significance to the principle of "no taxation without representation" would have condoned without much outcry such a blatant violation of the equally important principle of "no use of public funds without accountability". This indeed amounts to a quiet coup by the central bank.

When the crisis started in August 2007, the Fed's conventional balance sheet was just under $1 trillion – about seven percent of annual US GDP. At its peak,

towards the end of 2008, the Fed's conventional balance sheet was just over $2 trillion, about fifteen percent of annual US GDP. The Bank of England tripled the size of its balance sheet (as a share of GDP) over the same period. I see no problem at all with the size of the balance sheet *per se*. It is the logical consequence of the central bank, in a liquidity crisis, providing funding liquidity to systemically important financial entities (the lender-of-last-resort function) and market liquidity to markets for systemically important financial instruments (the market-maker-of-last-resort function (see Buiter (2007a,b,c,d, 2008), Buiter and Sibert (2007, 2008)).

The problem is not the size of the balance sheet but the size of the quasi-fiscal transfers the Fed has made to some of its private counterparties in its myriad interventions since the crisis started.

Let me start by restating that I believe there is no quasi-fiscal role for the Fed other than the one inherent in the pursuit of its macroeconomic objectives and of its legitimate financial stability objectives. The Fed should fund liquidity operations targeted at solvent counterparties. If it is required to deal (as agent of the Treasury) with potentially insolvent counterparties, the credit risk and counterparty risk should be assumed fully by the Treasury. This is not the practice of any of the leading central banks today; prior to the crisis, only the Bank of England came close.

The benchmark for the central bank should be a "Treasuries only" policy of balance sheet and liquidity management. Under a "Treasuries only" policy, the central bank only buys Treasury securities outright. In repos and other collateralised lending operations, it only accepts Treasury securities as collateral.

In an emergency, where the government requires the good offices of the central bank to stop systemically important institutions from collapsing, the form but not the substance of the "Treasuries only" policy can be relaxed. The UK shows the way as regards outright purchases by the Bank of England of private securities. The UK Treasury and the Bank agree on an upper limit on the amount of private securities that can be purchased by the Bank (currently €200 bn) and on the nature of the private securities that can be bought outright. Then the Treasury provides the Bank of England with a full indemnity (guarantee) for any private securities purchased by the Bank up to that limit. That is the right way to separate fiscal policy from monetary and liquidity policy.

The ECB, which is committed to buy a very limited number of private securities outright (it has set itself a limit of €60 bn for covered bond purchases of which, as noted earlier, only €45.5 bn has been used thus far), does not have such an indemnity from the 16 national Euro area fiscal authorities. The ECB therefore takes credit risk on these outright purchases. Even if this credit risk is priced appropriately *ex-ante*, the realisation of the risk could blow a hole in the balance

sheet of the ECB and reduce its capital. This is not a problem with the current scale of the outright purchase programme, but it puts the camel's nose firmly in the tent.

The Fed has been taking massive credit risk in its outright purchase programmes. In the original TALF, for instance, up to $1 trillion could be guaranteed by the Fed, but the Treasury indemnity for the programme was capped at $100 bn, leaving the Fed with a potential credit risk exposure of $900 bn. Other Fed programmes too have involved actual or potential exposures to private credit risk that were not guaranteed by the Treasury.

As regards repos and collateralised loans, the most extreme departure from the "Treasuries only" model has been the ECB. The Eurosystem accepts as collateral in repos and at the discount window an astonishingly wide range of private securities, including most asset-backed securities, as long as they have a rating of at least BBB-. This collateral policy has been implemented in such a loose and generous way, that international banks with subsidiaries in the Eurozone have packaged and wrapped securities they could not use as collateral anywhere else in formats that made them eligible collateral at the Eurosystem[7,8].

Only when the bank that borrowed from the Eurosystem has become insolvent, as in the case of Kaupthing's Luxembourg subsidiary and Lehman Europe, has the ECB had to write down its risky exposure. But with many technically insolvent or near-insolvent banks as counterparties (including quite a few of the German Landesbanken and the Spanish Cajas), the true exposure of the ECB is bound to be higher than it is willing to own up to. The Eurosystem has on its books large amounts of loans to dodgy banks secured against poor collateral. The resulting credit risk falls entirely and entirely inappropriately on the ECB.

The Bank of England and the Fed now also accept private securities as collateral in repos at the discount window and at many of the special facilities that were created to resolve the crisis. None of these loans by the central banks to private entities and collateralised against private securities are guaranteed by the national Treasuries.

What makes the problem worse is that all the leading central banks are not just faced with the possibility that, having made a properly priced collateralised loan to a private counterparty, a bad state of the world is realised, the counterparty goes broke and the collateral turns out to be impaired also. When such a double default occurs, the central bank acts in an *ex-post* quasi-fiscal capacity if there is no full Treasury guarantee.

[7] A bank cannot offer its own loans or other debt instruments as collateral to the Eurosystem. So two or more dodgy banks can swap their debts and use each other's dodgy debt as collateral.

[8] ABS must be rated AAA.

There are good grounds for suspecting that many of these loans were not even priced properly *ex ante* to reflect the associated credit risk, but were instead handed out on terms that implied an *ex-ante* quasi-fiscal subsidy. None of the three central banks, the Fed, the ECB or the Bank of England have been willing to reveal how they value illiquid collateral. Requests to make public either the pricing models or the actual valuations of all illiquid private securities offered as collateral have been systematically stonewalled by the central banks. That makes it impossible for external assessors to determine whether an *ex-ante* subsidy was involved in the terms and conditions of the loans[9].

The Fed went well beyond even this. In its bail-out of AIG, it refused for a long time even to reveal who the counterparties of AIG were that were made whole because of the Fed's emergency loans to AIG. They were forced to reveal the information in the end, but this does not undo the earlier attempt to hide the identities of the beneficiaries of the Fed's largesse[10].

Exiting from unconventional monetary policy means revealing the true extent of the quasi-fiscal transfers handed out and quasi-fiscal taxes imposed by the central banks in their financial operations. At the moment, we really see not much more than the conventional balance sheet shown in Table 1. The Fed's claims on the private sector (L) are valued in ways that cannot be verified. We know from the reports on the former Bear Stearns assets tucked away in a Delaware-based special purpose vehicle (Maiden Lane) and from the AIG assets stowed in Maiden Lane II and III, that the Fed has got at least some rubbish in exchange for the loans it has provided[11]. How much more write-downs and write-offs will we see?

It is true that central banks can be expected to make a profit on their lender-of-last-resort loans to solvent but illiquid counterparties. There is a wide gap between the liquidation value of the assets offered as collateral in times of stress and the present value of their held-to-maturity cash-flows. Central banks do exploit this situation to charge effective interest rates that are not just above the risk-free rate, but also at times above the default-risk adjusted opportunity cost of non-monetary funds to the central bank. The Fed just reported a provisional $14 bn profit from such lending activities[12]. It is good to know that when liquidity is scarce, the source of ultimate liquidity knows how to make a profit. This profit has no bearing on the question as to which counterparties benefited from

[9] Some spokespersons for the central banks have stated that since they provide information on the haircuts applied to all collateral, including illiquid private assets, all relevant information is in the public domain. That is incorrect. The haircuts are supposed to apply to the price or valuation of the security, not to its notional or face value. Unless we know the valuation to which the haircut is applied, we know nothing.

[10] On August 25, 2009, Manhattan Chief U.S. District Judge Loretta Preska ruled against the Fed in a Freedom of Information Act lawsuit brought by Bloomberg News. She rejected the argument that loan records are not covered by the law because their disclosure would harm borrowers' competitive positions. The Fed for the first time had to identify the companies in its emergency lending programs.

[11] See *Federal Reserve System Monthly Report on Credit and Liquidity Programs and the Balance Sheet*.

[12] See *Fed makes $14bn profit on loans provided during financial turmoil*, *Financial Times*, August 31, 2009.

quasi-fiscal subsidies from the Fed and from other central banks and in what amount. It is not just the aggregate or net quasi-fiscal subsidy of the central bank that matters. The redistributive quasi-fiscal activities of the central bank don't necessarily require any net subsidies to the private sector.

3.5. CONCLUSION

There are few if any technical problems involved in reversing the unconventional monetary policies – quantitative easing, credit easing and enhanced credit support – implemented by central banks around the world as short-term nominal interest rates became constrained by the zero lower bound.

The two main obstacles to an early and easy exit from unconventional monetary policies are political. The first is a potential conflict between the central bank and the fiscal authority about the role of monetary financing in the fiscal-financial-monetary programme of the state. If there is a conflict, the likely outcome is a win for the fiscal authority, except in the case of the ECB. The second political impediment to a prompt and painless exit from unconventional monetary policy is that scaling down the size of the central bank's balance sheet and the scale and scope of its other interventions in financial markets and institutions is likely to reveal the true extent of the central bank's quasi-fiscal activities during the crisis and its aftermath. The large-scale *ex-ante* and *ex-post* quasi-fiscal subsidies handed out by the Fed and to a lesser extent by the other leading central banks, and the sheer magnitude of the redistribution of wealth and income among private agents that the central banks have engaged in could (and in my view should) cause a political storm. Delay in the dropping of the veil is therefore likely.

Central banks don't have a redistributive mandate. That job should be left to the Treasury and the legislature. This encroachment of unelected technocrats on the domain of distributive politics is simply not acceptable in an open democratic society. That much of the redistribution effected by the Fed and other leading central banks is consciously hidden by the agency and kept under a cloak of secrecy in the name of counterparty confidentiality, market sensitivity or stigma effects makes it worse. Exiting from unconventional monetary policy will assist a fuller revelation of the exact nature of the quasi-fiscal actions of the Fed (and to a more limited extent the ECB and the Bank of England). The political benefits from the cleaning of the stables that will, I hope, result from this, will in my view dwarf the economic significance of a successful exit strategy.

REFERENCES

BERNANKE, B.S, 2009, "Reflections on a Year of Crisis", Speech given at the Federal Reserve Bank of Kansas City's Annual Economic Symposium, Jackson Hole, Wyoming, August 21, 2009. http://www.federalreserve.gov/newsevents/speech/bernanke20090821a.htm

BUITER, W.H., 2007a, "Central Banks as Market Makers of Last Resort 2", 17 August, FT.Com, Maverecon blog.

BUITER, W.H., 2007b, "Central Banks as Market Makers of Last Resort 3; Setting the prices", 21 August, FT.Com, Maverecon blog

BUITER, W.H., 2007c, "Central banks as market makers of last resort 4; liquidity, markets and mechanisms", August 23, FT.Com Maverecon blog.

BUITER, W.H., 2007d, "Central banks as market makers of last resort 5: a restatement", September 2, FT.Com Maverecon blog.

BUITER, W.H., 2007e, *Seigniorage*, *economics* – The Open-Access, Open-Assessment E-Journal, 2007-10.

BUITER, W.H., 2008, *Central banks and financial crises*, paper presented at the Federal Reserve Bank of Kansas City's symposium on "Maintaining Stability in a Changing Financial System", at Jackson Hole, Wyoming, on August 21-23, 2008 in Federal Reserve Bank of Kansas City, *Maintaining Stability in a Changing Financial System*, pp. 495 -693.

BUITER, W.H., 2009, *Negative Nominal Interest Rates; three ways to overcome the zero lower bound*, Paper presented Center for Financial Studies at the Goethe University, Frankfurt on 6th May 2009, at the European Central Bank on 18th May 2009, and at the 13th International Conference on Macroeconomic Analysis and International Finance at the University Campus of the University of Crete in Retymno Crete, May 28-30, 2009.

BUITER, W.H. and SIBERT, A.C., 2007, "The Central Bank as Market Maker of Last Resort 1", 12 August, FT.Com, Maverecon blog.

BUITER, W.H. and SIBERT, A.C., 2008, "A missed opportunity for the Fed", 17 August, FT.Com, Maverecon blog.

COLODNY, L. and GETTLING, R., 1991, *Silent Coup: The Removal of a President*, St. Martin's Press.

European Central Bank, 2009a, *Open market operations*.

European Central Bank, 2009b, *Decision of the European Central Bank of 2 July 2009 on the implementation of the covered bond purchase programme*.

JOHNSON, S., 2009, "The Quiet Coup", *The Atlantic Magazine* May; http://www.theatlantic.com/doc/200905/imf-advice.

OLSON, M.L. Jr., 1965, *The Logic of Collective Action: Public Goods and the Theory of Groups*, Harvard University Press, 1st ed. 1965, 2nd ed. 1971.

SARGENT, T.J., 1986 *Rational Expectations and Inflation,* Harper Collins Series in Economics.

SCHIMMELFENNIG, F., 1996, "Legitimate Rule in the European Union". (Working Paper 1.45), Berkeley: University of California, Center for German and European Studies, also Tübingen University Working Papers in International Politics and Peace Studies, No. 27.

4. Asset Prices and Monetary Policy: Some Skeptical Observations

Stefan Gerlach[1]

In reaction to the current global financial crisis, a growing number of observers are calling for monetary policy to play a more active role in preventing future episodes of financial instability by "leaning against" asset price bubbles. This demand reflects the now widely held view that low and stable inflation provides no guarantee against the development of financial imbalances, whose resolution risks triggering sharp recessions and unleashing deflation pressures.

Of course, the idea that monetary policy should also have a financial stability objective raises a number of questions for economic research. In my talk today, I will discuss what the role of monetary policy should be in preventing asset price bubbles. Since no consensus has emerged in the literature, I will present my interpretation of the current state of knowledge. I recognise that since there is little agreement about these issues in the profession, some of you will disagree with my views. That is good: only by a lively debate can we promote our understanding of these important matters.

My talk is structured as follows. I first review what role monetary policy played in the run-up to the crisis. To my mind, the key ingredient of the crisis, from a monetary policy perspective, was the fall in the yields on long real indexed (real) bonds, which triggered the search for yield which drove the demand for the new, highly complex and opaque financial instruments that played an important role in the crisis. I argue that that it is difficult to believe that changes in the short nominal interest rates that central banks control can account for this decline in long, real yields. Consequently, I think the role of monetary policy in the run-up to the crisis has been exaggerated.

Next I briefly review the two polar positions in the debate about asset prices and monetary policy: the *traditional* view that says that central banks shall focus solely on inflation in setting interest rates, and the *activist* view that holds that interest rates should help prevent the development of financial imbalances. I argue that the latter view presumes that financial imbalances, in the form of rapid credit expansion and asset prices misalignments, contain information about macro economic conditions beyond the two-three year horizon that central banks typically focus on in setting monetary policy. Furthermore, monetary policy must

[1] This chapter developed from a presentation first given at a conference on *Asset Prices and Monetary Policy* organised by Bundesbank, the GTZ and the People's Bank of China in Beijing on May 7, 2009.

have a large impact on asset prices relative to on real economic activity, since leaning against asset prices bubbles is otherwise likely to exacerbate the business cycle.

I go on to review the information content of a number of indicators of financial imbalances proposed in the literature, and argue that it is negligible. Thus, it is difficult for policy makers to know when a bubble that will have highly adverse macroeconomic consequences is forming. This suggests that they are likely frequently to conclude that a bubble is forming when in fact one is not.

This naturally leads to the question of what the effects of a leaning-against-the-wind policy on asset prices and the broader economy would be. This is a difficult question since no central bank to date has pursued such a policy. However, to the extent that it merely implies that central banks occasionally change interest rates by small amounts for financial stability reasons, it might not entail a fundamental change in the monetary policy framework. If so, it may be instructive to look at estimates of the effects of monetary policy based on data from recent decades. My interpretation of the available evidence is that a leaning-against-the-wind policy may exacerbate macroeconomic fluctuations.

Overall, I conclude that since central banks don't know when to respond to financial markets development but doing so is likely to have large, contractionary effects on the real economy, leaning-against-the-wind with monetary policy – as opposed to with regulatory and supervisory policy – would seem to be undesirable.

4.1. MONETARY POLICY AND THE CRISIS

Did monetary policy cause the crisis? It is now generally recognized that a number of factors played an important role in triggering the bubble that preceded the crisis. Severe incentive problems were plainly important. For instance, subprime lenders had little reason to conduct proper credit risk analysis in light of the fact that the loans would be securitized. Similarly, remuneration schemes in the financial sector encouraged short-term risk taking and herding. Furthermore, the fact that rating agencies sold advice to issuers about how to structure financial products so as to ensure a high rating was indicative of severe conflicts of interest in this important part of the financial system.

The crisis has also revealed weaknesses in the regulation and supervision of financial institutions. For instance, subprime mortgage originators were apparently not regulated. Furthermore, the existence in some countries of multiple regulatory agencies generated opportunities for regulatory arbitrage or for gaming the system. For instance, AIG was an unregulated business entity that exploited the

strength of its insurance affiliates that were large, regulated entities in good standing[2].

But while micro economic factors were of crucial importance, macro economic developments also played a role. In particular, the great moderation – the decline in the volatility of economic activity and inflation and the resulting increase in the predictability of monetary policy – led investors to conclude that financial markets had become much less risky. Together with the decline in expected returns, best captured by the fall in long real (indexed) interest rates, this triggered a search for yield that took two forms. First, investors increased leverage in order to raise returns. Second, they proved willing buyers of a range of new, highly complex and poorly understood financial instruments that promised higher returns at little extra risk, as evidenced by the fact that they frequently were triple-A rated.

What was the role of monetary policy in this process? Some prominent observers have argued that expansionary monetary policy pushed down real interest rates, and in this way stimulated the search for yield. But the argument that changes in policy-controlled short-term nominal interest rates impacted on long real interest rates seems incompatible with the idea that in the long run the real and nominal sides of the economy are approximately independent which provided the intellectual foundation for gearing monetary policy to low inflation.

Figure 1 (see page 57) contains plots of long real and short nominal interest rates in the UK and the US before the crisis erupted, and shows that that monetary policy indeed turned highly expansionary in the US in 2001 and, but less so, in the UK. Monetary policy was tightened from 2003-04 onwards, that is, some three years before the crisis erupted. In contrast, long real interest rates fell by half between the late 1990s and 2007, from around to 4% to around 2%, raising the prices of a range of assets and providing a powerful stimulant to financial market activity.

The monetary policy explanation thus faces the problem that theory suggests that the short nominal interest rates that central banks control should not have much impact on long real interest rates. Moreover, a cursory look at the data provides no support for the hypothesis that changes in monetary policy affected real interest rates.

4.1.1. Monetary policy responses to real interest rates

While monetary policy thus arguably played a negligible role in setting the stage for the crisis, it is interesting to ask the question whether the decline in long real

[2] See Kohn (2009).

interest rates could have induced central banks to adopt more expansionary monetary policies. That is, could there have been reverse causation?

To think about that issue, recall that monetary economics holds that the output gap, defined as the difference between the actual and the neutral level of output, depends on the wedge between the expected short-term real interest rate and the neutral real interest rate, and on the expected future output gap.

Suppose first that the neutral real interest is constant and the central bank cuts the nominal interest rate. If inflation is slow to adjust, the short real interest rate falls below the neutral rate, implying that monetary policy is too expansionary. Over time, this leads inflation pressures to build up, requiring the central bank after some time to raise the nominal interest rate in order to maintain inflation at the desired level. Excessively expansionary monetary policy will thus be undone after some time if the central bank seeks to stabilize inflation.

Assume next that the current and future neutral real interest rates fall, depressing long real interest rates, but that the central bank does not change the stance of monetary policy. With the actual real interest rate unchanged and the neutral rate having fallen, monetary policy is now too tight. For the central bank, it appears that, unexpectedly, economic activity is slowing and inflation falling. To maintain inflation at the desired level, it will reduce short-term nominal interest rates. Thus, theory suggests that policy-controlled interest rates, which are set or largely determined by policy, may respond to changes in long real interest rates, but that the converse is not true.

The idea that monetary policy may respond to changes in long real interest rates is also supported by data. To show this, I estimate a VAR model on monthly data from the UK for the one month nominal interest rate as a measure of the stance of monetary policy and the yield on indexed ten-year treasury bonds[3]. The sample starts in January 1993 when the Bank of England started to target inflation and ends in July 2007 before the financial crisis started. To identify the shocks I order the nominal interest rate first, which implies that the contemporaneous correlations of the innovations are attributed to the short, nominal interest rate affecting the long real rate[4].

The first graph in the first column of Figure 2 (see page 58) shows the effects of shocks to the short, nominal interest rate. These rise on impact and continue to rise for a few months, before gradually returning to the initial level. Interestingly, the shock has virtually no impact on long real interest rates, as shown by the second graph in the first column.

[3] See also Gerlach *et al.* (2009).

[4] The results are not sensitive to the inclusion of prices and the output gap; similar results are obtained on US data.

The second column shows the effects of shocks to long real interest rates. As shown by the lower graph, these are highly persistent: after two years the real interest rate remains about 10 basis points above the initial level. Interestingly, nominal interest rates rise gradually, reaching the same level as the real rate after about twelve months, as indicated by the upper graph.

Overall, these results are striking supportive of the analysis above: innovations of short nominal interest rates have virtually no effects on long, real yields. By contrast, innovations in long real yields elicit over time a one-for-one response in short nominal interest rates.

4.1.2. The decline on long real yields

It thus seems that a change in long real interest rates is, with a delay, reflected one-for-one in the stance of monetary policy. Thus, the decline in long real interest rates in the decade before the crisis may have influenced the entire term structure of interest rates and thus triggered a search for yield. But why did long real interest rates fall?

Bernanke (2005) argued that the decline in real yields was due to a global savings glut, that is, a tendency for *net* savings to rise at the going real interest rate. As an illustration, Figure 3 (see page 58) shows that in Emerging Asia, saving was roughly constant as a fraction of GDP between 1995 and 2001. In contrast, investment spending fell sharply following the onset of the Asian financial crisis in 1997, partially because the investment spending had been at an unsustainably high level during the boom phase that preceded the crisis. Only after 2001 did saving start to rise in Asia (although the increase is fully matched by an increase in investment). Figure 4 (see page 59) shows the same graph for oil-producing countries. In this case investment was roughly constant between 1995 and 2005 but saving rose sharply from 1998 onwards in response to higher oil prices. While global saving and investment both fell from 2003 onwards, as shown by Figure 5 (see page 59), this is of course compatible with the idea that there was an incipient increase in saving relative to investment.

One way to think about a global saving glut is as a reduction in the demand for goods and services at the going real interest rate. To restore equilibrium, real interest rates would have to fall to the point where the interest rate sensitive components of spending had risen sufficiently to restore goods market equilibrium. Since its is generally agreed that housing investment is particularly sensitive to real interest rates, the global savings glut hypothesis thus suggests that we would have observed a global housing boom from about 2000 onwards, as indeed was the case.

It is important to note that this housing boom – and the consumption boom

fuelled by housing equity withdrawal in some countries – was not the source of the crisis, but rather a symptom of the underlying imbalances that set the stage for the subsequent developments. Indeed, had housing investment not risen, real interest rates would have had to fall even further to induce an increase in some other component of spending.

4.2. TWO VIEWS ABOUT MONETARY POLICY AND ASSET PRICES

But if monetary policy did not cause the crisis, could it have prevented it? How should interest rates be adjusted in there is evidence that asset prices are rising rapidly or if they are rising elevated levels? There are two views.

A growing number of observers argue that central banks should take an *activist approach* and raise interest rates if signs of financial imbalances develop. Central banks operating with explicit or implicit inflation targets react in principle to all developments, including rapid credit growth and the asset-price increases that are the defining characteristics of financial bubbles, which influence aggregate demand and impact on the outlook for inflation. But the activist view goes further than so in arguing that monetary policy makers should react to financial imbalances over and beyond what they imply for inflation at the two-to-three-year policy horizon that central banks typically focus on. Slowing asset-price increases and reducing credit growth is warranted, it is argued, because a bursting bubble can have disproportionately large effects on inflation and economic activity at longer time horizons than those central banks normally consider when setting interest rates.

The activist view relies on four empirical propositions being true. First, central banks can determine in real time what constitutes an asset-price bubble by looking for signs of financial imbalances that are supposedly easily identifiable. Second, such imbalances contain information that is useful for forecasting the future path of inflation and output, also beyond the two-to-three-year horizon. Third, monetary policy can be used to influence asset prices and there is no risk of "non-linearities" in the sense that a small increase in interest rates might lead to a collapse in asset prices and trigger a deep recession. Fourth, the improvement in economic performance resulting from a tightening of monetary policy to forestall an asset-price bubble exceeds the short-run costs of inflation falling below target and economic activity being weaker than it otherwise would have been.

The competing view, which we call the *wait-and-see approach*, holds that central banks have insufficient information to conduct policy in this way[5]. There are

[5] See Kohn (2006 and 2008).

several reasons for this view. Most obviously, it is difficult to know when financial developments have become unsustainable since not all increases in asset prices are unwarranted. Moreover, by the time it starts to become clear that a bubble has formed, it has become too risky to tighten monetary policy since this may lead to an abrupt fall in asset prices and the risk of a sharp recession. There is also a risk that raising interest rates will do little to slow developments in the financial sector but that doing so will have a large effect on real economic conditions.

The wait-and-see approach thus holds that rather than gearing policy to asset prices, central banks should focus on the outlook for inflation and output and not react to a hypothetical future collapse in asset values. However if asset prices were to decline abruptly, central banks should be quick to reduce interest rates and to take whatever other measures are necessary to forestall a recession and inflation falling below the desired level.

These polar opposite views result from radically different assessments of how easy it is to diagnose financial imbalances and of the effects of monetary policy on asset prices and macroeconomic conditions. Next I review each of these issues separately.

4.2.1. The information content of financial imbalances

For it to be desirable for central banks to react with monetary policy to asset prices and credit growth it must plainly be the case that these variables contain information about future economic developments. Many authors, most recently the IMF (2009), follow the suggestion of Borio and Lowe (2002) and use the deviation of the current level of stock or property prices, or of credit, from a one-sided trend as a measure of financial imbalances[6]. The use of such "gaps" is natural and appealing in that they emphasize cumulative processes and seem suitable for capturing the gradual process by which financial systems tend to become overextended.

As emphasized by Borio and Lowe (2002), it seems likely to only "large" financial imbalances contain information about the future state of the economy. To operationalize this idea, the requirement that in order to be classified as a financial imbalance, deviations from trend must exceed an exogenously given threshold set by the analyst is typically used[7]. For instance, Assenmacher-Wesche and Gerlach (2009) use a threshold of 4% in the case of the credit-to-GDP ratio, 10% in the case of equity prices and 7.5% in the case of property prices.

[6] Of course, in computing the trend it is essential that only current and past data are used.
[7] The requirement that the deviations must persist for some time (typically four quarters) is also used by many authors.

Once financial imbalances have been defined, their information content for different variables can be explored. While the literature generally tends to focus on the information content of such "gaps" for future asset prices and banking crises, it appears more natural to study their information content for inflation and real economic activity since these are the goal variables of central banks. Indeed, only financial imbalances that impact materially on inflation and economic activity warrant an adjustment of monetary policy, even if their dissolution triggers disruptive adjustments in the financial sphere of the economy. Similarly, financial imbalances that unwind without triggering adverse dynamics in financial markets but do impact on broad macroeconomic conditions would seem to merit a monetary policy response.

Assenmacher-Wesche and Gerlach (2009) review the information contained in measures of financial imbalances constructed in the spirit of Borio and Lowe (2002) for inflation and output gaps, using a data set for 18 developed economies over a twenty-year period starting in the mid-1980s. Since central banks as a matter of course monitor inflation and output gaps and the stance of monetary policy as captured by short-term interest rates, Assenmacher-Wesche and Gerlach (2009) use a simple benchmark forecasting model only incorporating these variables. Next, they augment this equation using various combinations of the credit, equity price and property price gaps and compare out-of-sample forecasting performance of the benchmark and augmented models for forecast horizons ranging from 1 to 20 quarters. Importantly, they find that the models augmented with financial imbalances provide worse forecasts of both inflation and output gaps than the benchmark model, as could be expected given that they involve the estimation of more parameters on a finite data set.

However, one concern with financial imbalances is that they may have asymmetric effects. In particular their resolution may be associated with extreme tensions in the financial sector, leading to a collapse of aggregate demand and a large fall in economic activity and, potentially, the onset of deflation. The above forecasting experiments, which disregard the distinction between predicting increases and falls in inflation and the output gap, therefore miss the spirit of the activist view.

Assenmacher-Wesche and Gerlach (2009) therefore also consider forecasting dummy variables that are intended to capture "adverse macro economic conditions", defined as an output gap of less than -1% or inflation being either negative or declining by more than 2 percentage points, over four quarters. In this case, the augmented models forecast better than the benchmark model, but the improvement is negligible. More importantly, all models considered falsely predict a large number of episodes of adverse macroeconomic conditions that in fact did not occur.

What should be made of these findings? One may argue that as a consequence of

the Great Moderation in the mid-1980s, inflation and output became more stable and therefore more difficult to forecast. Thus, part of the reason for the poor forecasting performance may be that the sample period is unrepresentative. But using data from the 1970s would seem to be inappropriate since the large gyrations in inflation, output, interest rates, credit and asset prices in that period arguably largely reflect poor monetary policy. Since monetary policy frameworks have improved considerably over time – *e.g.* central bank independence has risen, policy has become more clearly focused on achieving and maintaining low inflation, decision-making procedures have been strengthened, transparency has been increased, economic forecasting has improved – it seem difficult to argue that data from this period is relevant for modern central banks.

An alternative explanation for the weak forecasting performance is that the measures of financial imbalances used are poor and, in particular, lack theoretical underpinnings. For instance, rather than looking at equity and property prices relative to time trends, one could look at them relative to corporate earnings (or dividends) and rental income. While it certainly seems desirable to adress these issues in future work, whether that would improve the forecasting performance is an empirical issue.

Another plausible explanation is that the use solely of data on economy-wide credit and asset prices misses important information. Perhaps better results could be obtained using measures of credit expansion for housing purchases or investment. Furthermore, data on housing investment or housing starts may also be informative about property price bubbles. Again, more work seems to be warranted.

But although the indicators of financial imbalances might be improved, it is difficult to deny that the notion that it is easy to construct measures of financial imbalances that are useful for monetary policy makers has been oversold. To my mind, the finding discussed above are best interpreted as indicating that is inherently difficult to forecast rare events, such as large recessions, and that long run forecasting is not easy[8].

4.3. EFFECTS OF MONETARY POLICY

One important consequence of the difficulties predicting future macroeconomic developments is that using discretionary monetary policy to deal with financial imbalances is likely to work poorly since false alarms are likely to be common.

[8] Indeed, better long run forecasts than those coming from the benchmark model considered by Assenmacher-Wesche and Gerlach (2009) can be constructed by assuming that in the long run inflation and the output gap are at their means.

But what, then, would the macro economic consequences be if the central bank raised interest rates in response to a perceived financial imbalance?

Addressing this question is difficult because no central bank has conducted monetary policy in this way. One way to approach the question is to argue that this policy would in fact be similar to the policies central banks have pursued in the recent past, except that, on occasion, they would move interest rates a small amount in response to credit growth and rising asset prices. Assenmacher-Wesche and Gerlach (2009) suggest that, if so, the effects such as an occasional deviation from the current policy regime could be captured quite well by the type of econometric model commonly used to study the monetary transmission mechanism.

Alternatively, the adoption of a leaning-against-the-wind policy could constitute a fundamental change in the way in which central banks set interest rates. In particular, the announcement effects could be large, as participants would know that rapid increases of asset prices would not be allowed to go unchecked for long and would have to consider the consequences of the expected tightening of monetary policy on the profitability of their actions. In this case, little can be learned from data generated under other monetary policy regimes.

Assenmacher-Wesche and Gerlach (2009) investigate the effects of monetary policy on the economy, assuming that the new policy regime is quite similar to that used by central banks in the recent past. They draw several important conclusions. First, they argue that the effects of monetary policy on asset prices are about as well defined as those on real economic activity. The common notion that asset prices are driven largely by sentiment and are therefore insensitive to monetary policy thus appears to be wrong. Second, the effects of monetary policy in the economy in boom times appear to be broadly the same as that on the economy in normal times. Third, monetary policy elicits a roughly five times larger response of asset prices than real GDP. Fourth and finally, equity prices respond much more rapidly than property prices to monetary policy changes.

These latter two conclusions have direct implications for a leaning-against-the-wind policy. Most importantly, leaning with monetary policy against an increase in asset prices will depress real economic activity. For instance, if monetary policy was tightened in order to unravel a 20-30% bubble in property prices, a literal interpretation of these results would suggest that real GDP would fall be perhaps 5%, an unimaginably large number. Even if the effect on asset prices was ten times the effect on real GDP, tightening monetary policy to undo the property price bubble would depress real GDP by 2.5%, which also entails a large loss of output.

One could argue that the same estimates imply that using monetary policy to stabilize real GDP would also induce movements in asset prices. That is of course true but those effects would be much smaller since real GDP fluctuates much less

than asset prices over the business cycle. For instance, an attempt to raise real GDP by 2%, which is quite a larger amount, would lead merely to about a 10% rise in asset prices.

The finding that equity and property prices respond at different rates is also important, since it implies that monetary policy cannot be used to stabilise both asset prices. Thus, if central banks were to attempt to mitigate swings in property prices by moving interest rates, it seems plausible that equity prices would experience larger gyrations than otherwise.

Overall, the evidence thus suggests that a leaning-against-the-wind policy is likely to be costly in the sense that stabilising property prices will destabilise real GDP. Of course, this would not be a concern if high and rising asset prices coincide with real GDP above trend. If so, leaning against property prices would merely push real GDP back towards the trend. While this is true, in this case a leaning-against-the-wind policy would be superfluous since central banks typically raise interest rates if real economic activity rises above trend.

4.4. CONCLUSIONS

The analysis above suggests the measures of financial imbalances proposed in the literature in practice to contain little information useful for predicting the future path of the economy. While it no doubt is feasible to construct better measures of financial imbalances, forecasting – particular beyond the two-three horizon central banks typically use – is inherently difficult. The notion that discretionary monetary policy can be used to prevent bubbles from forming therefore seems excessively optimistic. Furthermore, while monetary policy does have a powerful effect on asset prices, it also has important effects on real economic activity. It thus seems likely that leaning-against-the-wind with monetary policy is likely to amplify macroeconomic fluctuations, perhaps greatly. Overall, these two findings urge caution in adopting a leaning-against-the-wind policy.

While this conclusion may be discouraging, central banks and financial regulators have other sources of information, including supervisory data, that can be used to assess whether the financial imbalances are emerging. Moreover, they retain tools beyond interest rates that can be used to reduce the likelihood and severity of asset price bubbles. Overall it appears more appropriate to focus on regulation and supervision in seeking to maintain financial stability. Only if these tools are ineffectual is it desirable to use monetary policy measures.

REFERENCES

ASSENMACHER-WESCHE, K. and GERLACH, S., 2009, "Monetary Policy and Financial Imbalances: Facts and Fiction", Paper prepared for the Economic Policy Panel held in Tilburg, October 23-24.

BERNANKE, B.S., 2005, "The Global Saving Glut and the U.S. Current Account Deficit", Sandridge Lecture, Virginia Association of Economics, Richmond, Virginia, March 10.

BORIO, C. and LOWE, Ph., 2002, "Asset Prices, Financial and Monetary Stability: Exploring the Nexus", BIS Working Paper No 114.

GERLACH, S., Giovannini, A., Tille, C. and Viñals, J., 2009, *Are the Golden Years of Central Banking Over? The Crisis and the Challenges*, Geneva Reports on the World Economy 10.

IMF, 2005, "Global Imbalances: A Saving and Investment Perspective", Chapter 2 in *World Economic Outlook*, September.

IMF, 2009, "Lessons for Monetary Policy from Asset Price Fluctuations", Chapter 3 in *World Economic Outlook*, October.

KOHN, D.L., 2006, "Monetary Policy and Asset Prices", Speech at "Monetary Policy: A Journey from Theory to Practice", European Central Bank Colloquium held in honor of Otmar Issing, Frankfurt, March 16.

KOHN, D.L., 2008, "Monetary Policy and Asset Prices Revisited", Speech at the Cato Institute's 26th Annual Monetary Policy Conference, Washington, D.C., November 19.

KOHN, D.L., 2009, "Testimony before the Committee on Banking, Housing, and Urban Affairs, U.S. Senate", Washington, D.C. March 5.

MOËC, G. and FREY, L., 2006, Global imbalances, Banque de France, Occasional Paper No. 1.

Figure 1

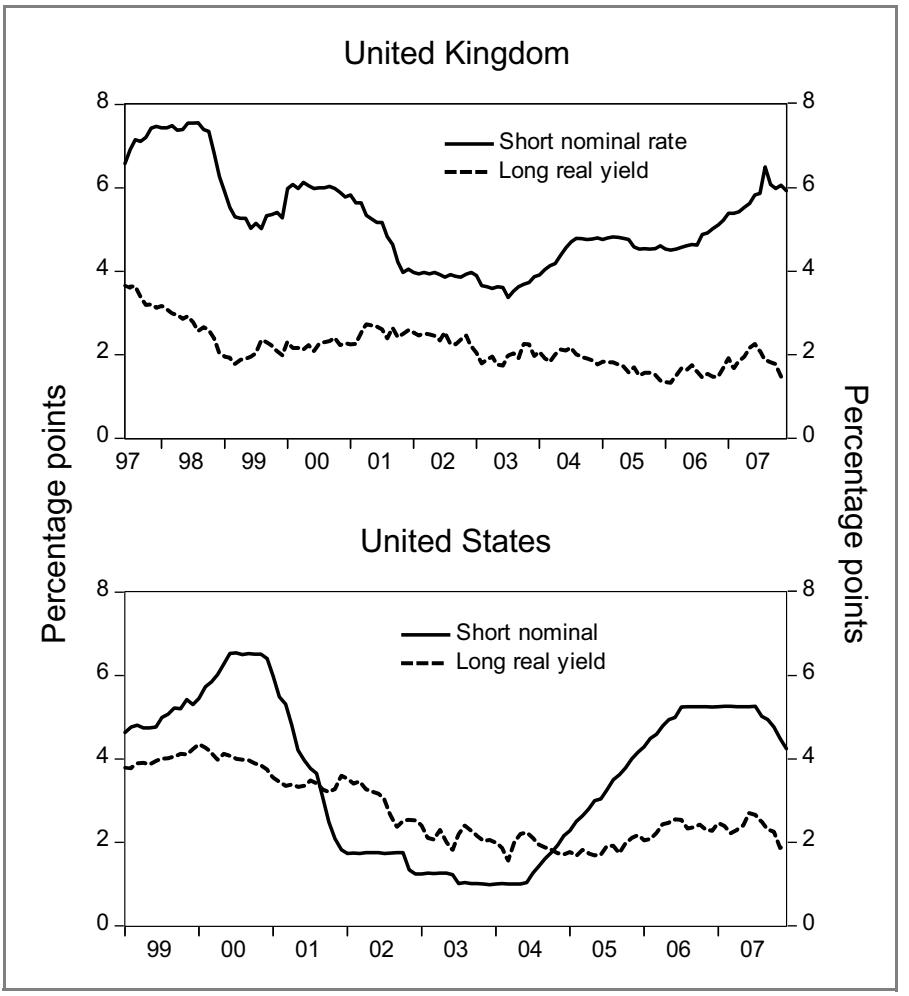

United Kingdom
Short nominal rate
Long real yield
Percentage points
Percentage points
8
6
4
2
0
97
98
99
00
01
02
03
04
05
06
07
United States
Short nominal
Long real yield
99
00
01
02
03
04
05
06
07

Figure 2

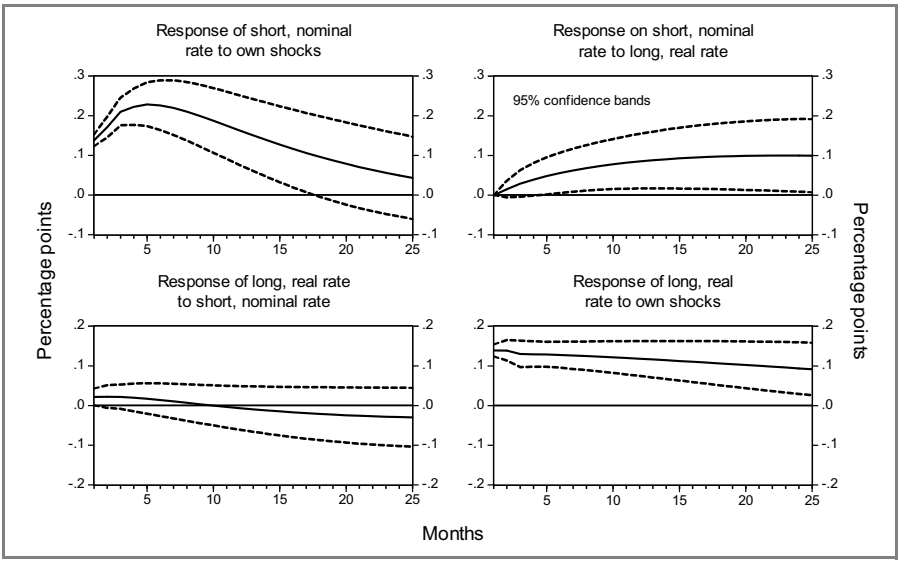


Figure 3: National saving and investment rates
(in % of area related GDP; Source: Moëc and Frey (2006, p. 4))

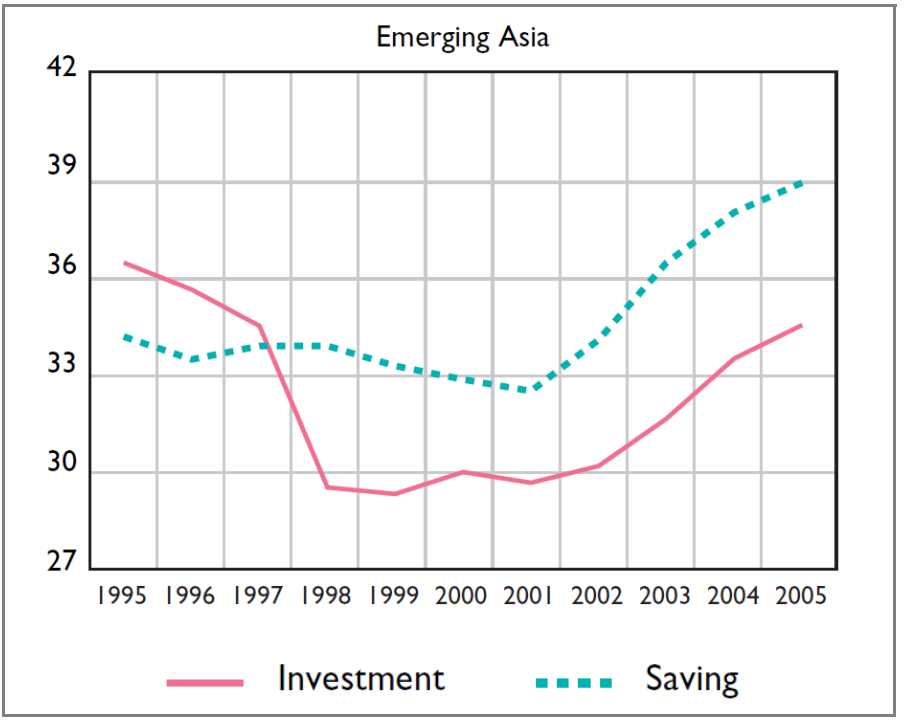


Figure 4: National saving and investment rates
(in % of area related GDP; Source: Moëc and Frey (2006, p. 4))

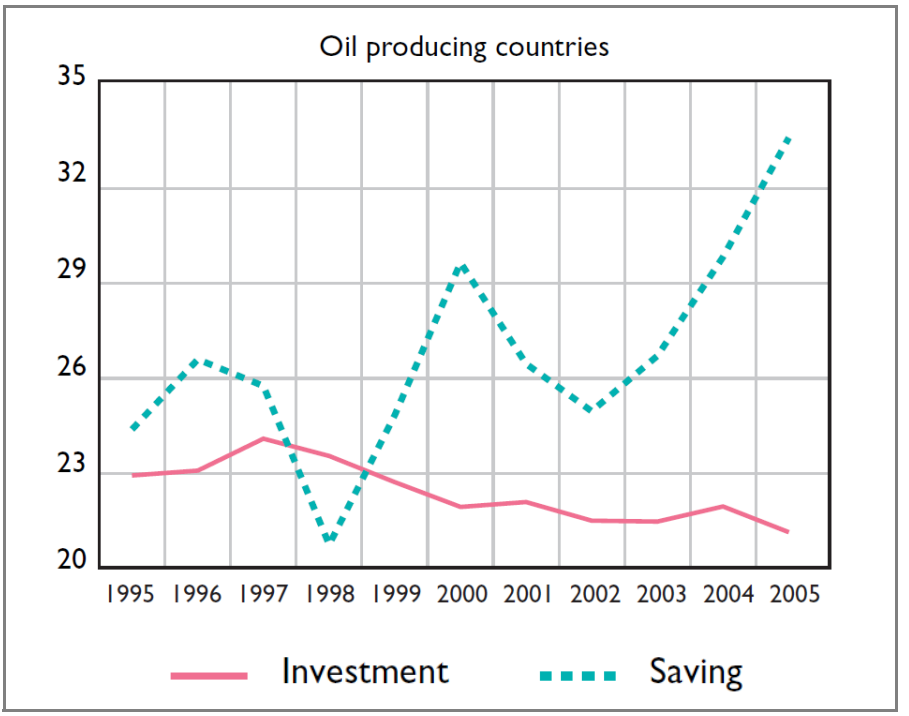
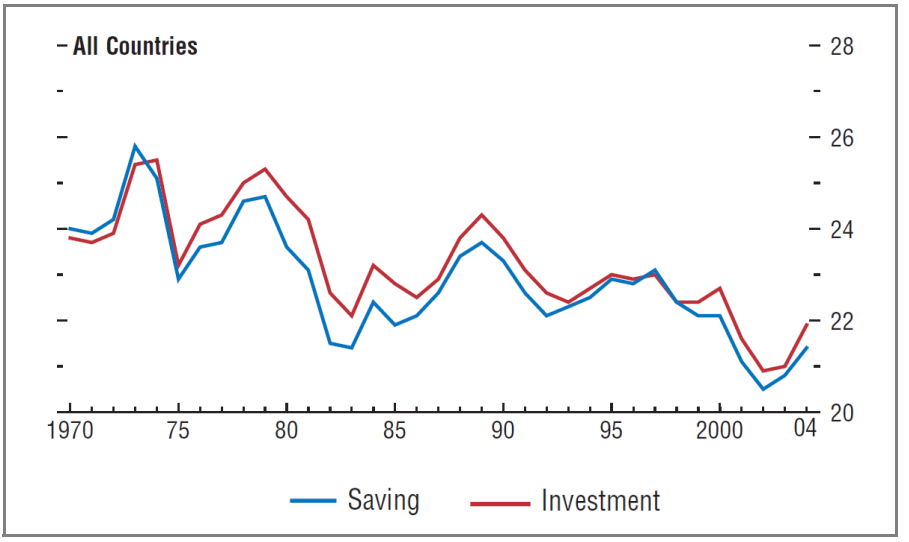


Figure 5: Global Saving and Investment
(Percent of world GDP; Source: IMF (2005, p. 92))



5. The Sustainability of Global Financial Imbalances

Clemens J.M. Kool

Abstract

In this paper, I provide evidence on the development of gross and net asset positions for a group of 23 developed countries over the period 1960-2008. The data show that both gross asset and liability positions and net foreign asset positions have increased tremendously for most developed countries, especially since the early 1990s. Apparently, the global financial system increasingly accommodates the build-up of large imbalances. In turn, these imbalances are a threat to the stability of the system itself. Especially in a situation where real exchange rate adjustment cannot be relied upon to timely correct the imbalances and where national macro policies are predominantly aimed at domestic goals, unchecked growth of global imbalances and subsequent currency or balance of payments crises is all too likely. I recommend more attention for global imbalances both in terms of gross and net foreign asset positions. Also the composition of foreign assets and liabilities and the currency denomination should be focus of attention. The suggestion is made to give the IMF a role in monitoring and perhaps taxing gross foreign asset positions.

5.1. Introduction

Two years after the start of the most serious global financial and economic crisis since the Great Depression in the 1930s, analyses of its causes and consequences abound. Most of these primarily attribute the crisis to microeconomic factors. The BIS 79th Annual Report 2009 (pp. 7-8) for example states that "*…the financial stress that began in the summer of 2007 has revealed a myriad of limitations in microeconomic financial arrangements. These include problems with incentives; flaws in techniques used to measure, price and manage risk and in the corporate governance structures used to monitor it; and failings of the regulatory system…. The crisis has revealed distorted incentives for consumers, for financial sector employees and for rating agencies.*" Similarly, the most recent IMF World Economic Outlook (April 2009), on page 34 notes that "*…the crisis was largely caused by weak risk management in large institutions at the core of the global financial system combined with failures in financial regulation and supervision.*" The last quote draws attention to the crucial role that the "*global financial sys-*

tem" – though not itself the origin of the current financial crisis – has played in its propagation.

Over the past decades, especially developed countries have become increasingly financially integrated, as witnessed for instance by the exploding amount of cross-country capital flows. This trend has continued and even accelerated in recent years. According to the BIS (2007)[1], daily turnover in traditional foreign exchange markets amounted to $3.2 trillion in April 2007, reflecting 71 percent growth since the previous survey in April 2004. In the over-the-counter market for interest and foreign exchange derivative contracts growth equal to 74 percent was recorded since April 2004. The daily turnover in these markets was $4.2 trillion in April 2007[2]. Gross stocks of foreign assets and liabilities show impressive growth over the past decades as well. At the end of 2006, on the eve of the crisis, the ratio of average foreign assets and liabilities to GDP equaled 2.62 for a group of 24 high-income countries. For some small open economies, like Ireland (11.35), Switzerland (5.74) and the Netherlands (4.27) this ratio even was substantially higher. The same holds for the UK (4.08) with its large financial center. On the other hand, the same ratio in the US and the EU only equals 1.18 and 1.54 respectively[3]. It demonstrates the relatively closed character of these two large economic blocks. It also points to the fact that many of the foreign assets EU-member states hold are liabilities of other EU member states.

Clearly, the sophisticated and integrated system of global financial markets and institutions has facilitated the global transfer of risky assets and complicated derivatives. Without it, most likely less financial institutions worldwide would have had bad assets coming from the US real estate crisis on their balance sheets. In turn, probably more – local – financial markets would have remained open and functioning and in many countries macroeconomic costs of the ensuing recession would have been lower. Similarly, without the global financial system Icelandic banks like Landsbanki, Kaupthing and Glitnir would have found it substantially more difficult to attract foreign currency funding on the scale they actually did and to channel both the funds and the corresponding currency exposure through to Icelandic consumers and firms. Consequently, the virtual default of the Icelandic economy might have been prevented.

This is not to say that we should – if possible at all – go back to the state of affairs of the 1960s, when capital flows only were allowed to pay for imports of goods and services. That would throw out the baby with the bath water. There were and still are very convincing arguments for a well-developed, open and stable global financial system. In particular, the desired optimal allocation of capital and the

1 Triennial Central Bank Survey of Foreign Exchange and Derivatives Markets Activity.
2 Clearly, this dwarfs cross country flows related to trade (exports) in goods and services, which on an annual basis only amounted to $14.5 trillion in 2007.
3 We refer to Cooper (2008) and Obstfeld (2004) for similar evidence in 2005 and 2003 respectively.

optimal diversification of risk necessitate such a system. Nevertheless, a closer look at the risks and returns of the international financial system and the way it needs to be regulated and monitored is warranted, therefore.

Apart from the direct role of transmission and propagation mechanism in the current crisis, the international financial system has also been linked to the existence and persistence of so-called global imbalances. In turn, these imbalances are seen as a potential contributing factor to the current crisis. According to the BIS (2009, p.4) *"….the macroeconomic causes [of the crisis] fall into two groups: problems associated with the build-up of imbalances in international claims and difficulties created by the long period of low real interest rates."* The IMF (2009, p. 34) has the view that "*although global imbalances may have been a factor behind the buildup of macroeconomic and financial excesses that led to the crisis……..a disorderly exit from the dollar has not yet been part of the crisis narrative."*

These quotes refer to an ongoing debate on two issues. On the one hand, there is the issue of the causes and consequences of the low level of world wide real interest rates in the past decade. These low rates are seen as one of the triggers of the excessive lending and asset price bubbles that led to the 2007 crisis[4]. On the other hand, there is the fear of a sudden decline in the value of the US dollar and its financial and macroeconomic consequences. Over the past decades, the US has run large and persistent current account deficits requiring other countries to run current account surpluses[5]. How long these imbalances can persist is unclear. If in the near future the rest of the world would stop financing these deficits a dollar plunge could occur and add to the already dismal state of many economies. So far, that scenario has failed to materialize.

Obviously, the attention for global financial imbalances in general and their consequences for the dollar in particular predates the current crisis. A thorough literature review would require a paper in itself and falls outside of the scope of this paper[6]. The issue also figures prominently in almost every IMF World Economic Outlook since 2005. Despite the long debate no consensus exists about the ultimate solution of the US deficits and the required decline of the dollar. According to Feldstein (2008) and Krugman (2007) it is not if but when the dollar will fall. Krugman adds that the major questions are whether the plunge will be gradual or sudden – depending on the degree of market myopia – and whether the macroeconomic costs of the plunge will be high or low. Faruqee and Lee (2008) argue that the build up of global imbalances has been excessive and warrants strong adjustment. On the other had, Cooper (2008) and Higgins and Klitgaard (2007)

4 See for instance Bernanke (2005).
5 Note though that one could easily argue that the surplus countries have forced the US to run these deficits.
6 We refer to Clarida (2007) and Obstfeld and Taylor (2004) as prime examples of this literature.

deem the current US deficits sustainable as they mainly are the reflection of relatively high innovativeness and productivity of the US economy. Gruber and Kamin (2007) conclude that a gradual transition is possible. In their view, capital flows from – among others – the US to the developing world will resume after the reserves build-up in Asia has been completed. In its World Economic Outlook of April 2009 the IMF is ambiguous but ultimately concludes that "*concerns about global imbalances have not gone away*" (p. 38).

Mainly due to the path-breaking work of Lane and Milesi-Ferretti (2001, 2007) there is growing recognition of the importance of gross and net stock of foreign assets and liabilities when thinking about sustainability. Despite this recognition, most of the debate is still in terms of funding annual flows with generally only implicit reference to the underlying stocks. As I will illustrate in this paper, more attention should be paid to the impact of countries' gross and net foreign asset positions. I will focus especially on the link between increased financial integration on the one hand and the increase in global imbalances on the other. Doing so, I will mostly abstract from short-run effects of the current crisis, but concentrate on long-term trends. Global imbalances defined in terms of both flows and stocks still persist and probably will grow further in the future. In turn this raises questions about future macro-driven instability that goes beyond the narrow US dollar perspective.

In the next section, I briefly elaborate on the link between different dimensions of international economic and financial integration and their interrelation. Subsequently, section 3 summarizes evidence on the development of gross and net asset positions for a group of 23 developed countries over the period 1960-2008. The data show that both gross asset and liability positions and net foreign asset positions have increased tremendously for most developed countries, especially since the early 1990s. Apparently, the global financial system increasingly accommodates the build-up of large imbalances. In turn, these imbalances are a threat to the stability of the system itself. Especially in a situation where real exchange rate adjustment cannot be relied upon to timely correct the imbalances and where national macro policies are predominantly aimed at domestic goals, unchecked growth of global imbalances is all too likely. In section 4 I discuss sustainability issues and potential adjustment. I point out the particular characteristic of the euro area that allows participating countries to accumulate foreign debt without apparent consequences. Finally section 5 concludes. I recommend more attention for global imbalances both in terms of gross and net foreign asset positions. Also the composition of foreign assets and liabilities and the currency denomination should be focus of attention. The suggestion is made to give the IMF a role in monitoring and perhaps taxing gross foreign asset positions.

5.2. ECONOMIC AND FINANCIAL INTEGRATION

As recent as 2001, Obstfeld and Rogoff list six major puzzles in international macroeconomics and finance[7]. Each puzzle demonstrates in its own way that international economic and financial integration is far from complete at the time despite the perceived progress in terms of increased capital mobility. Although these puzzles had been studied in isolation before, Obstfeld and Rogoff (2001) – henceforth OR01 – are the first to actually link them together and to provide a uniform explanation of the failure of international integration to have its theoretically expected effect. They hypothesize that imperfections in the goods markets due to the existence of trade costs may be the major explanatory factor behind the home bias in trade puzzle, the Feldstein-Horioka (FH)-puzzle, the home bias in equity puzzle, the consumption correlation puzzle, the purchasing power puzzle and the exchange rate disconnect puzzle[8]. The first four of these are so-called quantity puzzles, while the latter two are price puzzles requiring a more sophisticated model including imperfect competition and sticky prices and wages.

In the subsequent discussion in this paper, I focus on the four quantity puzzles, which can be briefly summarized as follows. First, in an open economy without any barriers, consumption would theoretically not be biased towards home goods. In practice, consumers seem to have a strong preference for home goods. This is called the "home bias in trade puzzle". The second puzzle concerns the lack of international diversification of asset portfolios. Theoretically, portfolio diversification theories and international versions of the CAPM model predict fully internationally diversified portfolios to be optimal. However, empirical evidence shows that the composition of asset portfolios is strongly biased towards domestically issued assets. This result is referred to as the "home bias in asset portfolios puzzle". Third, when risk sharing is perfect and the Arrow-Debreu conditions are satisfied, consumption growth will be equal in all countries and only depend on world output (income) growth. Country-specific output shocks would have no impact on domestic consumption as the risks of these idiosyncratic shocks would have been totally diversified across the world. Only global shocks would lead to consumption fluctuations. The obvious results would be relatively low correlation coefficients between domestic income and consumption growth rates and (almost) perfect correlations in consumption growth rates across countries. In reality, domestic consumption growth is generally highly correlated with domestic income growth and cross-country consumption growth rates differ significantly over long periods of time. This is called the "risk shar-

[7] We also refer to Lewis (1996, 1999, 2000).

[8] OR01 stress the dominance of goods market imperfections as the common factor underlying the above puzzles, but explicitly allow for alternative influences, including capital market imperfections. With respect to the equity home bias puzzle, they expressly point at the likely influence of information asymmetries and legal restrictions as potentially relevant determinants, which in their view fall under a broader definition of transaction costs.

ing" or "consumption smoothing" puzzle. Finally, perfect financial integration should lead to a loosening up of the relation between domestic savings and investment as countries would be able to use the improvement of the international capital market to finance savings-investment imbalances to an ever-increasing degree[9].

Less than a decade later, there is growing evidence of at least a partial fading out of some of these puzzles. In my view, it is unlikely that the structure and level of transactions costs in goods markets has changed sufficiently to be the major cause behind the virtual disappearance of some puzzles, as would be implied by the OR01 hypothesis. Improvements in international financial markets seem a more plausible explanation. Since the beginning of the nineties the opening up of capital markets begins to show in rapidly increasing cross country capital flows and asset and liability positions. Simultaneously with the increase of international capital flows, asset home bias seems to decrease (Obstfeld, 2004) while risk sharing increases (Brandt *et al.*, 2006) and the link between domestic savings and investments deteriorates. Consequently, the idea of the interdependence of the puzzles is further enhanced. Below, some additional evidence is provided to support the case for financial integration being the prime driver of the reduced relevance of the various puzzles.

First, Figure 1 displays the development of economic and financial integration. The dashed line represents the average trade flows from 1960 to 2007 for a sample of 23 developed countries[10]. For each country, I compute the average of exports plus imports per unit of GDP for each year in the sample. The average trade flow in a given year then equals the cross-country average in that year. Similarly, the drawn line represents average assets stocks. For each country and each year, I take the average of its foreign assets and liabilities as a percentage of GDP. The average asset stock in a given year then is the cross country average in that year[11].

Focusing on the relevant period and starting in the mid 1980s, the average trade flow variable rises from 30 percent of GDP to 40 percent. I assume the average trade flow variable is a proxy – be it an imperfect one – of trade integration. A higher value then represents a cross country reduction in the home bias in trade,

[9] Feldstein and Horioka (1980) were the first to document a strong and stable relationship between domestic savings and investment in a cross-country estimation for 16 OECD-countries for the period 1960-1974, suggesting low rather than high international capital mobility and integration. We refer to Coakley *et al.* (1998) and Lapp (1996) for a concise overview of recent research on the issue.

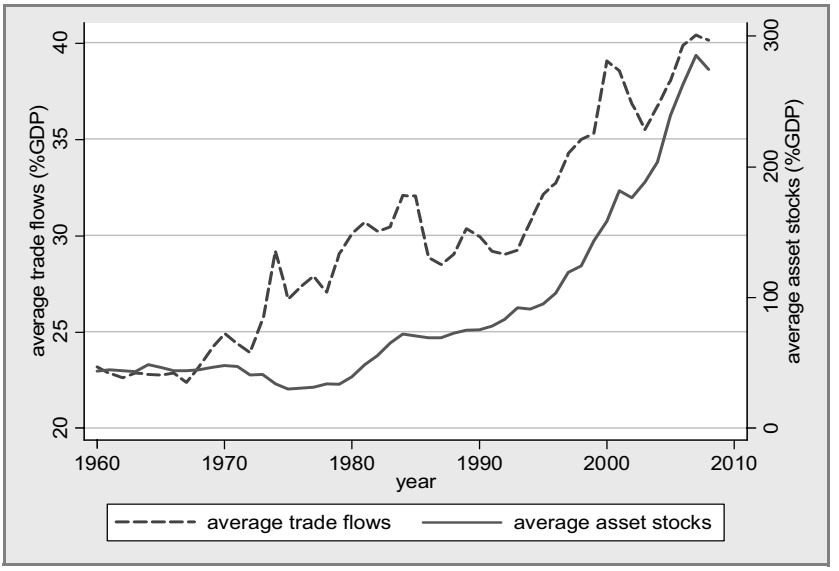
[10] The countries are Australia (AU), Austria (OO), Belgium (BE), Canada (CA), Denmark (DK), Finland (FI), France (FR), Germany (GE), Greece (GR), Iceland (IC), Ireland (IR), Italy (IT), Japan (JP), Mexico (MX), the Netherlands (NL), New Zealand (NZ), Norway (NW), Portugal (PT), Spain (SP), Sweden (SE), Switzerland (CH), the United Kingdom (UK), and the United States (US).

[11] Trade data come from the IMF's International Financial Statistics database. The asset and liability data come from the IMF's International Investment Position (IIP) database. Especially in the early years data are missing for many countries. Starting from the early 1980s, most countries are covered.

one of the OR01 puzzles. Over the same period, average foreign assets and liabilities increase from around 80 to 260 percent of GDP. Most of this explosive trend takes place after the mid 1990s. Since the denominator in this variable is GDP and not a measure of a country's total financial asset value, the rise does suggest a reduction in home asset bias.

The pattern of both lines is roughly the same. However, note the difference in scale. The figure strongly suggests that it is especially financial integration that developed strongly since the 1990s. Any reduction in size and significance in related major puzzles in international macroeconomics and finance, therefore, is more likely to be the result of financial integration developments than of real economic developments.

Figure 1: Growth in economic and financial integration



In table 1 I use data from Holinski *et al.* (2008) to provide more detailed evidence on reductions in home equity bias. The table presents portfolio equity wealth and equity home bias for a selection of developed countries in 1990 and 2005 respectively. Portfolio equity wealth (PEW) is measured as a country's stock market capitalization (at market value) plus its net foreign position in equity as a percentage of GDP, while equity home bias (EHB) measures how far away the country is from holding the world equity portfolio. A value of zero implies the absence of equity home bias.

The table convincingly shows that between 1990 and 2005 portfolio equity wealth strongly increased in most countries – Japan being the exception – while

equity home bias strongly decreased. Obviously, considerable heterogeneity exists across countries. Anglo-saxon countries and countries with large financial centres typically have relatively high equity wealth. Equity home bias is low for the most financially developed countries. Within this group, especially some of the smaller economies like the Netherlands, but also Belgium, Austria, and Finland (unreported) have almost completely diversified their equity portfolios in 2005[12].

Table 1: Portfolio Equity Wealth and Equity Home Bias

Country	PEW		EHB	
	1990	2005	1990	2005
Australia	0.18	0.96	0.82	0.78
France	0.15	0.77	0.79	0.57
Germany	0.16	0.64	0.83	0.41
The Netherlands	0.27	1.13	0.64	0.14
Japan	0.93	0.79	0.96	0.83
United Kingdom	0.52	1.57	0.66	0.57
United States	0.29	1.28	0.86	0.59
Average (23 countries)	0.20	0.92	0.80	0.56

Sörensen *et al.* (2007) show strongly declining equity and debt home bias from the 1990s onward and demonstrate that consumption risk sharing increases simultaneously. Holinski *et al.* (2008) provide supporting evidence of the joint development in equity home bias and consumption risk sharing, using both absolute and relative equity home bias measures in their analysis. Using data from 1980 to 2007 for a group of 23 OECD countries, they apply a non-linear panel method to estimate the time-varying response of country-specific consumption growth rates to country specific GDP developments. On average 25 percent of idiosyncratic income shocks is diversified away for this group of countries, so that a country facing a one percent negative income shock only experiences a 0.75 percent drop in consumption. Heterogeneity across countries is substantial though. Using 2005 data, it can be shown that the overall consumption risk sharing coefficient for the US equals 0.68, which exceeds the average 0.75. The US profits from its high portfolio wealth (-0.09) but loses a bit from somewhat higher than average equity home bias (+0.02). For the Netherlands, benefiting from both above average equity wealth (-0.05) and in particular from below average equity home bias (-0.23), the risk sharing coefficient even equals 0.47. Overall, the conclusion is that ongoing financial (equity) development in general and ongoing international financial integration and cross-country diversification in particular have significant beneficial effects on consumption risk sharing among

[12] I refer to Sörensen *et al.* (2007) for similar evidence on Debt Home Bias.

developed economies. Consequently, restrictions on international capital flows that inhibit this type of risk sharing may come at a significant welfare cost.

Similarly, Kool and Keijzer (2009) demonstrate a considerable deterioration in the S-I relation since the mid-1990s. Cross-sectional evidence shows that the coefficient linking domestic savings to domestic investment starts a downward trend in the mid 1990s. By 2000, the coefficient is virtually zero and insignificant and savings has no explanatory power for investment anymore. Put differently, the FH-puzzle has disappeared and domestic savings and investments move independently from one another. Moreover, Kool and Keijzer (2009) use a non-linear panel regression technique to demonstrate that higher overall cross-country openness – trade integration measured as the average of exports and imports as a ratio of GDP – and lower equity home bias both significantly reduce the strength of the link between domestic savings and investments over time. In addition, above average country-specific equity diversification and lower equity home bias also have a significant effect on the I-S link. Quantitatively, the effect of the financial variables – measuring equity home bias – strongly dominates the trade variables. Their conclusion is that it is especially financial integration that has helped to reduce the FH-puzzle and to accommodate domestic investment through foreign savings. Faruqee and Lee (2008) provide evidence in the same direction. They find the current account universe to expand even faster than implied by increasing financial globalization.

In summary, both real and financial integration have strongly increased over the past decades. Evidence suggests particularly financial integration has contributed to the disappearance of a number of longstanding puzzles in international macroeconomics and finance: both the FH puzzle, the trade and equity home bias puzzle and the consumption correlation puzzle have been substantially reduced since the mid 1990s.

5.3. GLOBAL IMBALANCES

We now turn to the issue of global imbalances. In the previous section I have presented evidence of the increase in consumption risk sharing through portfolio diversification and the decrease in the link between domestic savings and investments as a consequence of strong increases in international financial integration since the mid 1990s. The latter phenomenon can be roughly translated as an increase in countries' possibilities to run current account deficits and surpluses. In turn, as stressed in the FH literature, it allows for an increase in a country's intertemporal optimization of consumption, part of which is a risk sharing mechanism similar to global portfolio diversification. For a better insight, it is instruc-

tive to compare the risk sharing characteristics of portfolio diversification with those of current account imbalances using two stylized cases.

In principle, risk sharing through portfolio diversification does not require any intertemporal exchange or current account imbalances. Suppose two equally sized countries decide to sell one half of their claims on home output to the other country and receive one half of the other country's claims on its output in return. No current account effects would arise from the deal. Moreover, the consumption effects of any future output shocks would be shared equally among the two countries. The country hit by a positive output shock would pay out half of the revenues (dividends) to the other country which in turn could use these dividends to buy half of the extra output from the first country. The income account and trade account effects of the shock would cancel out, leaving the current account balanced. Risk sharing in this case has an intratemporal character.

Intertemporal risk sharing works differently. Now a (temporary) positive output shock in country 1 would make it sell part of its excess output to the second country, running a current account surplus. In the absence of further shocks and assuming no growth, the current account will be zero again afterwards. However, the surplus country has a net claim on the deficit country's output in all future periods. The original surplus country then can run a small trade deficit, consuming more than it produces, financed by the income from its net foreign asset position.

Obstfeld (2004) argues that under certain strict conditions – amongst others a perfect world with complete contingent claims (stock) markets – one would expect intratemporal risk sharing through portfolio diversification to dominate intertemporal risk sharing through current account imbalances. It also directly shows the limitations of the Feldstein-Horioka analysis. The latter assumes a linear or at least monotonous relation between the degree of capital mobility and the strength of the S-I relation. Higher capital mobility then reduces the S-I link and raises the size of current account imbalances. The above arguments show that may be valid only while moving from a world with very low capital mobility to one with high capital mobility but still strongly incomplete contingent claims markets. At the moment contingent claims markets become more developed it is quite possible that higher capital mobility will lead to stronger intratemporal risk sharing and smaller rather than larger current account imbalances.

Of course there is a second argument for current account imbalances separate from risk sharing considerations. In case one country experiences a shock in productivity that requires an expansion of its capital stock, new capital will flow in and temporarily cause a current account deficit.

In both of the above cases, current account imbalances are temporary and on average offsetting. As a result, no long-run trends in the cumulative current account ratio – or net foreign asset ratio would result. Reality is different. Current account imbalances are highly persistent, as documented for instance by Faruqee and Lee (2008). Countries with a string of current account surpluses in the past which consequently have built up a net foreign asset position are likely to continue running surpluses. On the other hand, countries with a string of current account deficits from the past which consequently have built up a net foreign debt (liability) asset position are likely to continue running deficits.

The consequences of more scope for current account imbalances and more persistence in these imbalances are displayed in Figures 2 and 3. Both figures use data for the same group of 23 OECD countries defined previously for Figure 1. Figure 2 shows the minimum and maximum (dotted line) current account ratios across countries per year plus the cross country annual standard deviation (bold drawn line). Over the last years of the sample, Iceland has an extreme impact on the minimum value of the current account ratio. Therefore, the cross-country minimum is given both including (dotted line) and excluding (thin drawn line) Iceland. Up till 2003 the lines overlap.

Figure 2: Current account imbalances

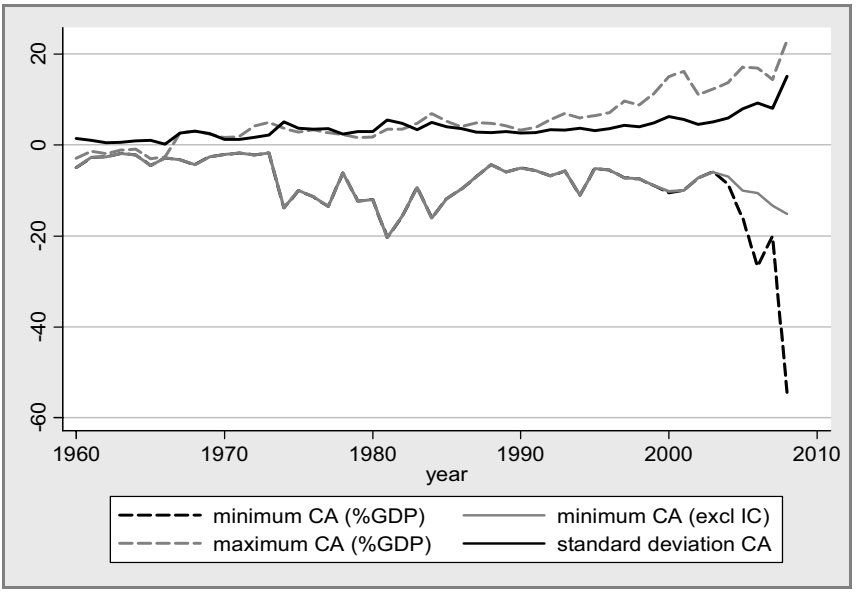
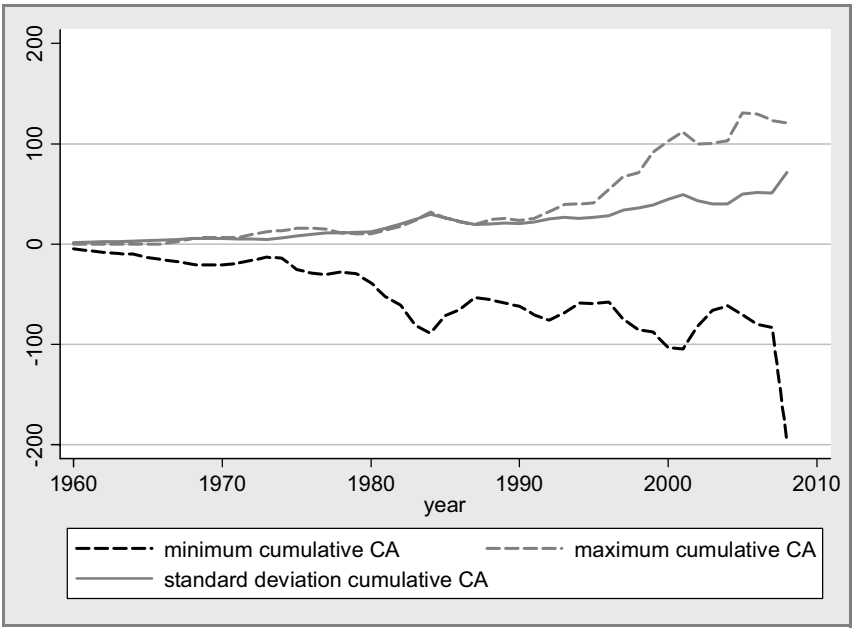


Figure 3: Cumulative current account imbalances



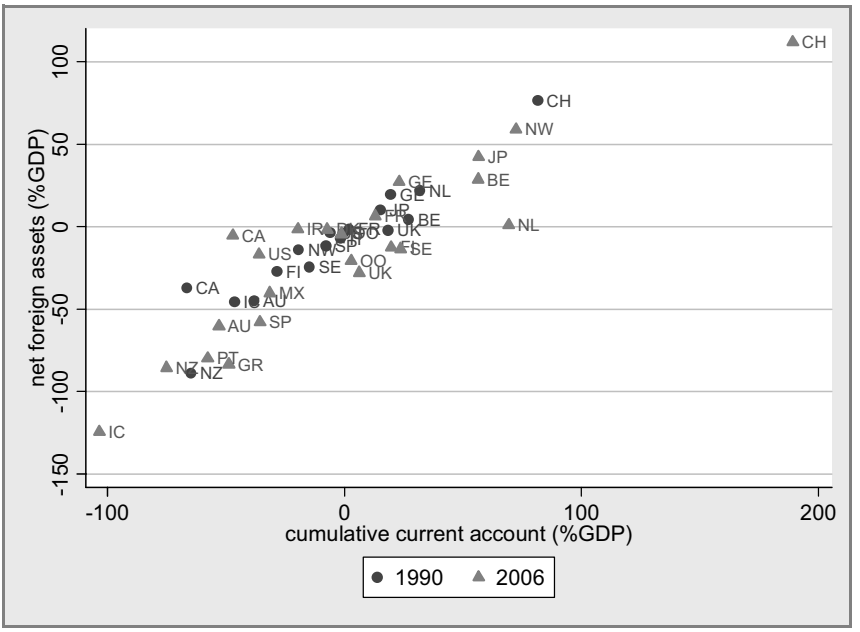
A few points stand out in Figure 2. The period around 1980 is also characterized by sizable deficits. Note that macroeconomic volatility in the late 1970s and early 1980s was extremely large with inflationary and subsequent disinflationary episodes, volatile monetary and fiscal policies and extreme oil price movements. Since the start of the great moderation, current account imbalances have been more limited to rise again from the late 1990s onward. This phenomenon is reflected in the rise of the spread between maximum and minimum current account ratios and in the rise of the cross-sectional standard deviation. Note that emerging Asian economies with massive current account surpluses like China and Korea are not included here because of lack of historic data.

In Figure 3, the stylized facts of cumulative current account imbalances are presented graphically for the same group of 23 countries. Again minimum and maximum ratios are presented together with the cross-sectional standard deviation. Countries with persistent deficits move to net foreign liability positions close to 100 percent of GDP since the late 1990s. In 2008, Iceland's cumulative current account ratio dropped to almost 200 percent of GDP, illustrating its virtual default. On the other hand, the maximum net foreign asset position (occupied by Switzerland) already is above 100 percent of GDP since the year 2000.

The combined message from Figures 2 and 3 is not only that current account volatility has considerably increased over time – especially in the last decade – but

also that absolute levels and volatility of the net stocks of foreign assets and liabilities have considerably increased.

Figure 4: Net foreign asset development per country 1990-2006



In Figure 4, the countries specific development of net foreign assets is shown. The figure serves two purposes. First, it allows a comparison of cumulative current account positions per country on the horizontal axis and net foreign asset positions per country on the vertical axis. These two measures of a country's net external position are strongly related but can differ because of measurement errors. These may arise as the two variables are measured independently through different methodologies. Cumulative current account figures are computed from national income and balance of payments statistics which start from income flow data. On the other hand, net foreign asset positions are computed by the IMF on the basis of surveys of gross stocks of assets and liabilities. Both methods suffer from measurement problems[13]. Differential returns on assets and liabilities, composition effects in the gross stocks of assets and liabilities and (unexpected) valuation gains and losses are a second well-known determinant of the wedge between the sum of past current account imbalances and the resulting net foreign asset positions[14].

[13] See Lane and Milesi-Ferretti (2009) for a thorough analysis of the US case in this respect.
[14] See Lane and Milesi-Ferretti (2001, 2007).

Second, the figure allows a comparison of country specific developments between 1990 and 2006. I select these specific years as 1990 predates the explosive increase in global financial integration, while 2006 is the last year in the sample not influenced too much by the current financial crisis.

A few points stand out. First, as was already suggested by Figure 3, we see that net asset positions grow in both directions between 1990 and 2006. Put differently, the circles representing the 1990 situation are clustered around zero much more than the triangles that represent the 2006 situation. For most countries a movement to either the north-east or south-west corner of the figure is clearly visible. Persistent surplus countries like Switzerland, Japan, Norway and Belgium see their net positions increase considerably. China is not included in the figure but would also belong to this group. Persistent deficit countries like Iceland, Ireland, Spain, Portugal, Greece, Australia and New Zealand experience the opposite movement and have increasing net liability positions. Note that the US does not belong to the group of countries with extreme imbalances, despite its dominant position in the debate on the sustainability of global imbalances.

Second, a strong positive correlation is visible between cumulative current account position and net foreign asset position. They are not one-to-one linked, supporting the relevance of valuation effects, composition effect and return differentials as hypothesized by lane and Milesi-Ferretti (2001, 2007). The Netherlands and Switzerland, for instance, have a much lower net foreign asset position than would be expected on the basis of their current account surpluses, while the US has a lower net liability position than would be expected on the basis of its persistent deficits. On the other hand, the figure convincingly shows that the two measures are comparable for most countries. That is, despite the fact that cumulative current account positions ignore valuation effects, they are still quite informative of most countries' net foreign asset position.

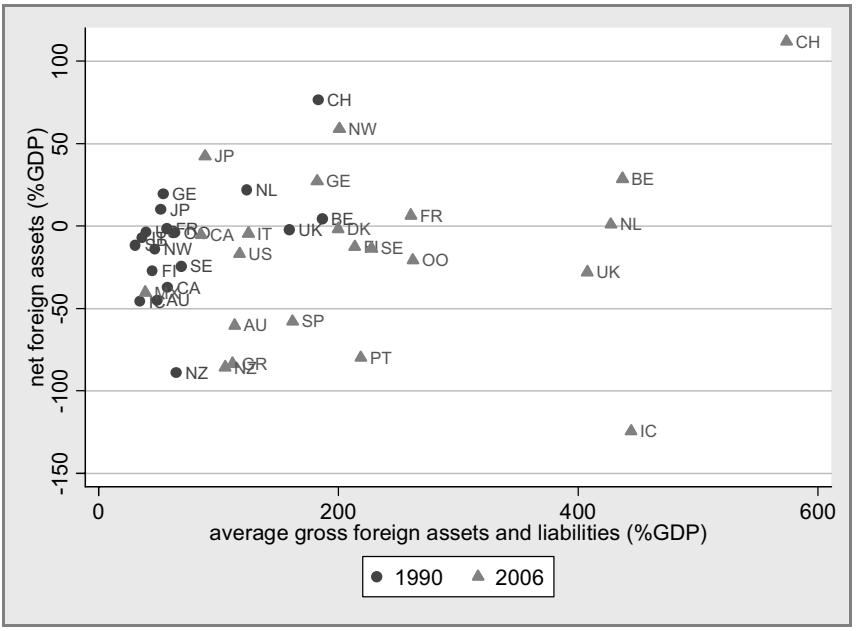
Figure 5 complements the evidence in Figure 4. On the horizontal axis we display each country's gross foreign position – measured as the average of foreign assets and liabilities as a percentage of GDP – while the net foreign asset position is on the vertical axis[15]. The figure clearly shows that both gross and net positions fan out between 1990 and 2006. In 1990, most countries (circles) are located in the centre left. The 2006 data (triangles) typically have moved both to the right, indicating increased gross positions, and up or down, indicating increased imbalances.

To sum up, in this section I have shown that both gross and net positions have strongly increased since the early 1990s. Not only the cross-country minimum and maximum current account balance in a given year have become more pro-

[15] Ireland is an outlier in this graph with a gross position close to 1,000 percent of GDP. It has been excluded from the graph to enhance expositional clarity.

nounced. Due to high current account persistence, net foreign positions typically have grown and become more dispersed too. Simultaneously, gross asset and liability positions have increased. In the next section, I turn to the issue of sustainability and adjustment.

Figure 5: Gross and net foreign asset development per country 1990-2006



5.4. SUSTAINABILITY AND ADJUSTMENT

Figures 4 and 5 give the situation with respect to gross and net foreign asset positions at the end of 2006, just before the financial crisis started. I deliberately exclude 2007 and 2008 to avoid mixing the information in the trend movements with temporary phenomena. Clearly, the current crisis will have large and differential impacts on gross and net positions of these countries. Milesi-Ferretti (2009), for instance uses preliminary data to determine the effects for the US in 2008. He estimates the deterioration of the net foreign asset position to be over $2 trillion. This would almost double the negative net position of the US in terms of its GDP from close to 17 to over 30 percent. Main causes are the appreciation of the dollar – leading to capital losses on foreign assets and the leveraged position of the US with mostly debt-like foreign liabilities and mostly equity-like foreign assets. Available IMF data for the Netherlands suggest this country actually improved its net foreign asset position in 2008.

Here, my focus is not on changes in individual positions during this period of turmoil and transition. Instead, I would like to focus on the trend and the longer-run concerns of sustainability and adjustment. It is clear though that the current crisis can severely affect – the sustainability of – a country's individual position. Factors that will play a role in the near future are the – temporary – decline in world trade hitting countries asymmetrically as well as the effects of the extreme expansionary fiscal programs most governments have engaged in. The national savings identity equates the current account balance to the sum of net government savings and net private savings. With fiscal accounts in deficit everywhere and private savings rates probably rising but not necessarily to the same degree across countries, new patterns of current account imbalances may well emerge. In addition, the doubling of central bank balance sheets in the US, the UK and the euro area potentially flood the system with excess liquidity that at some point may turn into inflationary pressures and increased exchange rate volatility.

Fortunately, in some sense that has little impact on the issue whether current account imbalances in the long run will be sustainable and how necessary adjustment will take place. A useful starting point is the recognition that the net foreign asset over GDP ratio cannot decline without boundaries. At some point, a country's indebtedness simply becomes too large relative to its earning capacity. Then, default will occur and the exchange rate will collapse. Of course, one would hope markets would see the need for adjustment far ahead of this point and arrange for a softer landing[16]. Past currency crises are no great cause for optimism in this respect. Neither is the Icelandic experience in the period 2003-2008. Table 2 shows that from 2003 onward, Iceland's current account saw a trend-like deterioration with parallel adverse developments in the country's net and gross foreign asset position. Only in May 2008 international rating agencies downgraded Iceland from AAA to AA. The actual collapse of Iceland's banks and currency took place early October 2008.

Table 2: The Case of Iceland (all variables in %GDP)

Year	Current account	Net foreign assets	Gross foreign liabilities	Gross foreign debt
2003	-4.5	-62.6	146.8	134.3
2004	-8.6	-67.5	191.8	173.0
2005	-16.2	-83.6	325.4	274.2
2006	-26.7	-124.4	506.4	429.0
2007	-20.2	-110.6	626.4	536.6
2008	-54.5	-320.8	932.8	892.7

[16] I refer to Krugman (2007) for a thorough discussion on the forward-looking character of market expectations and their role in the dynamics of global imbalances.

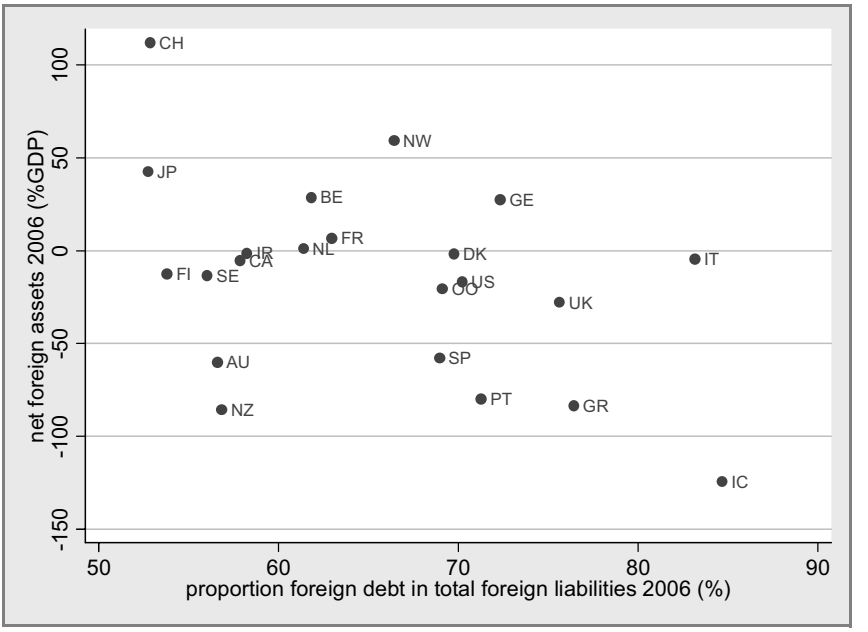
For surplus countries, it would technically be feasible to have an ever-growing ratio of net foreign assets over GDP. It is hard to see, though, why a country would want to stay in such a position as at some point it would like to convert foreign wealth into domestic consumption. In summary, continuously increasing indebtedness is unsustainable. Continuously increasing wealth accumulation is undesirable – and requires other countries to increase their indebtedness continuously. Overall, the conclusion is that net foreign asset positions need to stabilize as a percentage of GDP at some point, see also Krugman (2007) and Cooper (2008). While the sustainable level of the NFA/GDP ratio is undetermined, it is clear that higher steady state indebtedness raises the interest payments to the rest of the world and puts stronger pressure on the trade balance.

It is not just the net foreign asset position of a country that determines the degree of sustainability and fragility. Other factors play a role of their own and may interact with the level of (negative) net foreign assets. First, a given negative net foreign asset ratio can be the result of infinitely many gross foreign asset and liability levels. Generally speaking, higher gross asset and liability positions increase the susceptibility of the net position to valuation gains and losses and, thus, potentially endanger sustainability. In addition, the composition of assets and liabilities and the currency denomination play a crucial role. The higher the level of gross non-contingent claim liabilities (debt), the more fragile a country's external position is. When simultaneously such country has foreign assets with predominantly a contingent (stock) character, leverage is high as is fragility. This fragility is further increased if the debt is denominated in foreign currency, because the standard adjustment through real exchange rate depreciation now has adverse effects and actually increases the net debt in domestic currency.

Figure 6 provides additional information on the composition of each country's foreign liabilities in relation to its net foreign asset position. Here some assumptions had to be made. Total liabilities have been split up in equity and FDI liabilities on the one hand and all other liabilities on the other. Apart from foreign debt, this last category contains banks' liabilities, derivatives and monetary authorities' foreign liabilities. Especially the derivatives measures in the IIP database are incomplete and unreliable. No information is available on the currency denomination of the different liability categories or for instance the composition of banks' liabilities. Nevertheless, the picture gives valuable insights[17].

[17] For Mexico, data have only become available recently and for many categories are still missing. In 2006, its net foreign assets position was slightly negative and its proportion of foreign debt below 40 percent. For clarity of exposition, Mexico has been excluded from Figure 6.

Figure 6: Composition of foreign liabilities



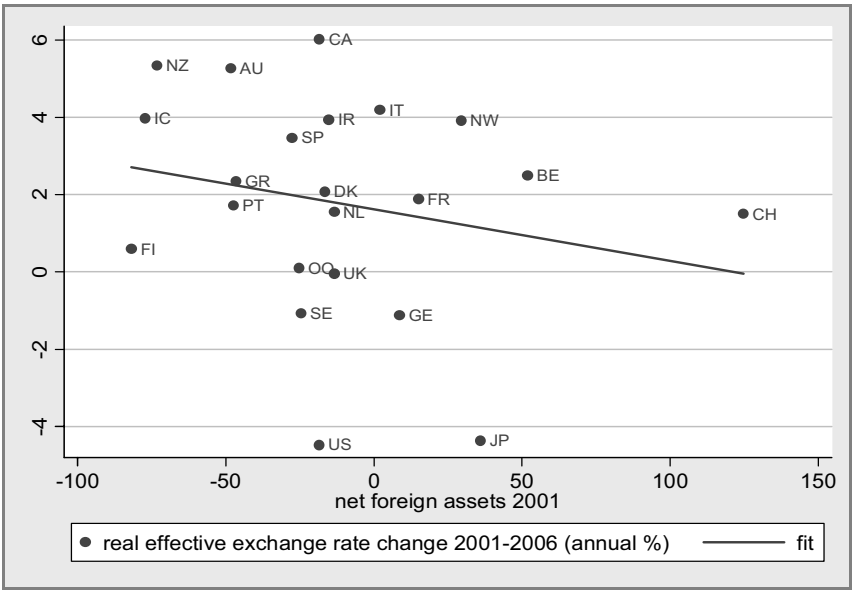
On the horizontal axis, the proportion of foreign debt-like liabilities is given as a percentage of total liabilities. A negative pattern is visible in the data. It suggests that surplus countries tend to have relatively little gross foreign debt (as opposed to FDI and equity liabilities), while deficit countries have relatively high debt liabilities. Consequently, the most risky countries are in the lower-right corner: Iceland, the United Kingdom and most of the South-European euro area countries. These countries combine high foreign debt finance with sizeable negative net wealth positions in 2006. For Iceland the curtain has already fallen. Especially Greece, Spain and Portugal appear to be in the danger zone.

In the literature on global imbalances, it is mostly the US that is blamed for being in an unsustainable position. In the analysis above, however, the US never surfaces as a potential problem. Its gross asset and liability level is relatively low and its external debt position is not extreme. Even when cumulative current account imbalances (around 40 percent) are taken as the relevant measure rather than the net foreign asset ratio (about 17 percent), no urgent problem seems to exist. The reason for this is that our analysis so far is in terms of the country's own GDP. In absolute terms, however, the US deficit is overwhelming and requires about 70-80 percent of the excess savings of the joint surplus countries, including the major Asian economies. Here, I will not focus too much on the US position as it is so singular. Not only because of the economy's absolute size but also because of the special role of reserve currency the dollar still has. Suffice it so say that I agree

with Krugman (2007) that a significant dollar depreciation at some point will be required. For the moment, there is a catch22 situation with those countries holding dollar reserves unwilling to accumulate more on the one hand but unwilling to let the dollar depreciate and realize a massive capital loss on the other. Clearly, this is unsustainable. While both the timing and the size of the depreciation are uncertain, it will happen. Krugman (2007) also argues that the macroeconomic costs probably will be limited. This may be true for the US. Its relatively closed economy character, the positive effect of a depreciation on its exports as well as the positive wealth effect on its net foreign assets may make a dollar depreciation more of a problem for the rest of the world than for the US. The rest of the world will face both a decline in export demand from the US and a negative wealth effect on its foreign (dollar) assets. As long as this scenario has not realized, it would be wise not to further increase dollar exposure and reduce the addiction we have to the dollar. An attractive and appropriate substitute for the dollar as reserve currency unfortunately is unlikely to be available soon.

Let us turn now to the issue of adjustment and assume we rely on market forces. Then, real interest rates and real exchange rates primarily need to do the job. Typically, theory predicts surplus countries with high and rising net foreign asset positions to have a high and appreciating real exchange rate – and a low interest rate. Capital losses on foreign assets and a higher burden of foreign liabilities will have a negative wealth impact. Simultaneously, the real appreciation will increase imports and reduce exports, thereby causing a decline in the trade balance of the current account. For deficit countries with negative and declining foreign wealth positions the reverse holds. A broad IMF (2007) study shows that current account reversals are normally accompanied with the appropriate real exchange rate changes. However, the same study also concludes that the real exchange rate is insufficient to do the job alone. Moreover, the study is silent as to how long it will take before real exchange rate adjustment starts when persistent imbalances have emerged and, subsequently, how long it then takes for the current account to react.

Figure 7: Real exchange rate adjustment



The evidence in Figure 7 about the strength and reliability of the real exchange rate mechanism is weak and inconclusive to say the least. On the horizontal axis each country's net foreign asset position in 2001 is presented, while the vertical axis measures the average annual percentage change in the country's effective real exchange rate over the period 2001-2006. In theory, a positive relation would be expected. The graph shows a negative one! The US experience is corresponding to theory, however. A small negative net foreign asset position in 2001 leads to a real depreciation in subsequent years. Not shown here is the fact that due to other factors the real depreciation only had a marginal effect on the US current account over the period. Other indebted countries like Australia and New Zealand, Iceland, Finland, Greece, Spain and Portugal actually saw a real appreciation over the period 2001-2006. Note that Iceland experienced massive depreciation in 2008. In short, while the real exchange rate in the end may step in, there is considerable concern about the horizon at which this will occur, about the level to which the net foreign asset position needs to fall before this happens and about the sharpness of the exchange rate change at that time. Figure 7 throws considerable doubt on this standard adjustment mechanism.

Alternatively, domestic macro policies could be used to help current account reversals to be realized. Empirical evidence suggests that deficit countries often need fiscal consolidation to do this. Obviously, this is not a good time to think about fiscal consolidation. It is concerning though that persistent current account imbalances appear to be met with benign neglect in both deficit and surplus coun-

tries. Apparently, it is taken for granted that the imbalance will be compensated without problems on the global capital market. In the short run such assumption may be correct, in the long run it most surely is not as the stock consequences will weigh increasingly on the country. A reconsideration of the underlying reasons of persistent current account imbalances appears in order. This holds equally for a surplus country like the Netherlands that has failed to build a noticeable net foreign wealth position despite almost three decades of current account surpluses and deficit countries like New Zealand, Portugal and Greece. The latter three countries now have a negative foreign wealth position close to 100 percent of GDP. They should ask themselves whether they believe the continuous inflow of capital that corresponds with their current account deficits is really caused by expectations of relatively high profitability of capital investments in their economies. If not, severe problems are likely to emerge in the future.

For small deficit countries in the euro area like Greece, Spain, Portugal, Italy and Ireland a specific issue arises. Since the start of the euro area in which they participate, their current account imbalances have grown steadily. They run persistent deficits without any apparent consequences as if it were a free lunch. As the euro's behaviour is not primarily determined by their performance, their euro participation appears to provide a perverse incentive and allows consumption in excess of long-run income. But for a given nominal euro exchange rate and common nominal interest rate, the ultimately required real depreciation can only be achieved by domestic contraction that causes a negative inflation differential with the other euro countries. Similarly, the real interest rate can only rise with below average inflation or even deflation. Dramatic domestic macro policies would be required for this to happen. In the current setting, an appropriate real exchange rate or real interest rate adjustment mechanism appears to be missing. In the absence of macro adjustment, it may imply that North-European households and firms "own" most of these Southern European countries' assets. Economically, this may not be a problem, socially and politically it definitely is. M ore research is needed to analyse causes and consequences of this unique situation.

5.5. SUMMARY AND CONCLUSIONS

In this paper, I have analyzed developments in gross and net foreign asset positions for a group of 23 developed countries between 1960 and 2008. Over this period both international trade integration and international financial integration have increased considerably. Higher capital flows and a build-up of stocks of foreign assets and liabilities especially emerge from the early 1990s onward. A brief literature review shows accumulating evidence of the disappearance of once dominant puzzles in international macroeconomics and finance. Home bias in

trade and assets has decreased, consumption risk sharing has increased and the link between domestic savings and investments has been broken.

Overall, increased financial integration and international capital mobility is perceived as a good thing. It brings better allocation of resources and new opportunities for international risk sharing. However, the evidence in this paper also shows that financial integration accommodates the emergence of global imbalances. I take 1990 and 2006 as benchmark years to show that for many countries the net foreign asset position has grown. Current account imbalances appear to be highly persistent, leading some countries to have steadily growing net foreign assets and other countries to have steadily growing net foreign liabilities. As of 2006, Iceland's net foreign liabilities significantly exceeded its GDP while also countries like Portugal, Greece, New Zealand and Australia had net foreign liabilities close to their respective GDP levels.

It is unclear at which level of net foreign liabilities a country's situation becomes unsustainable. Partly this depends on other factors such as the level of gross foreign assets and liabilities, the foreign "leverage" – measured as the proportion of debt in total foreign liabilities – and the currency denomination of foreign assets and liabilities. Information on these other factors is limited. However, gross asset and liability positions keep growing for all developed countries. In addition, it is again Iceland, Portugal, Spain and Greece that have high leverage, making their negative net foreign asset positions more precarious than that of countries like Australia and New Zealand. Finally, easy solutions for adjustment are absent. Preliminary evidence shows that real exchange rate adjustment is an unreliable and unpredictable mechanism at best. Domestic macro policies could substitute for autonomous real exchange rate changes in theory. In practice, current account imbalances suffer from benign neglect in most countries.

In my view it is clear that the issue of global imbalances is underrated in research and policy discussions. To the extent it receives attention, it mostly focuses on the US dollar and the US current account deficit. In an absolute sense, this US bias is understandable as the size of the US negative net foreign asset position implies a heavy claim on the rest of the world's savings. In a relative sense, the US is in a much better position with respect to net foreign liabilities than many other countries, even when leaving aside its exit option through depreciation of the dollar as the world's reserve currency.

Therefore, I conclude that the likelihood of currency and balance of payments problems will increase in the years to come if timely adjustment is not given higher priority. How to manage this is not straightforward for the reasons mentioned. Potentially, the IMF could play a useful role. After all, the IMF was founded to monitor, supervise and help solve balance of payments problems. It acts as a supra-national supervisor of countries' macroeconomic and financial

stability through article IV consultations, press releases and country studies. In my view, it often fails to convincingly take this role. The case of Iceland is a prime example. Despite excessive current account deficits in the period 2003-2006 no early warning came forward from the IMF. Undoubtedly this omission to a large part arose because of the eternal dilemma of the supervisor: publicly warning for unsustainable imbalances may trigger the crisis, while keeping silent provokes criticism ex post. Nevertheless, an institution with the ambition to be the supranational macroeconomic and financial supervisor needs to find ways to warn far enough in advance to avoid the unsustainability to grow out of control.

A simple way to increase both individual countries' awareness of potential current account related unsustainable imbalances would be to require the IMF to make available a set of relevant and uniform risk indicators with respect to the size and sustainability of countries' external positions periodically and to provide a relative ranking of all countries. Obviously more transparency and less ambiguity should be applied than is the case now with the country-specific concluding Article IV statements.

A more ambitious plan that would formalize a stronger role for the IMF, would be to set up a system where each country is to put up an interest free margin requirement – in SDR or gold – on all its gross foreign liabilities with a debt character. Such a requirement would be similar to margin requirements on futures exchanges and consistent with new regulation for non-financial companies to post margins against derivatives contracts. Implementation of such a system of course requires some additional thinking in design as well as in the consistent measurement of foreign (debt) liabilities. In terms of design, it should be noted that countries in this proposal are seen as the accountable counterparty of the IMF and as such need to come up with the margin requirement (collateral). However, the gross foreign positions are created not only by the government but also and sometimes even predominantly by private financial and non-financial firms. Governments then could be expected to levy a capital tax on these individual businesses and institutions to provide the funds for the margin requirement.

In the end, it would give countries – especially those with large international banking sectors – and financial and non-financial businesses additional incentives to monitor the build up of gross liability positions. It also provides incentives to attract foreign equity of FDI rather than foreign debt and to rely more on intratemporal than intertemporal risk sharing. As such, it might put a brake on an excessive build up of gross foreign liabilities. Simultaneously, it would provide the IMF with a larger pool of funds to use in case of balance of payments crises and to prevent straightforward collapse in emergency circumstances.

REFERENCES

BERNANKE, B.S., 2005, *The Global Savings Glut and the U.S. Current Account Deficit*, remarks at the Sandridge lecture, Virginia Association of Economists, Richmond, Virginia.

BIS, 2007, *Triennial Central Bank Survey of Foreign Exchange and Derivatives Markets Activity*.

BIS, 2009, *79th Annual Report*.

BLANCHARD, O., GIAVAZZI, F. and SA, F., 2005, "International Investors, the U.S. Current Account, and the Dollar", *Brookings Papers on Economic Activity*, 1, pp. 1-49.

BRANDT, M.W., COCHRANE, J.H. and SANTA-CLARA, P., 2006, "Risk Sharing is Better than You Think, or Exchange Rates are too Smooth", *Journal of Monetary Economics* pp. 671-698.

CLARIDA, R.H., 2007, *Current Account Imbalances: Sustainability and Adjustment*, The University of Chicago Press, Chicago.

COAKLEY, J., KULASI, F. and SMITH, R., 1998, "The Feldstein-Horioka Puzzle and Capital Mobility: A Review", *International Journal of Finance and Economics* pp. 169-188.

COOPER, R.N., 2008, "Global Imbalances, Globalization, Demography and Sustainability", *Journal of Economic Perspectives* 22:3, pp. 93-112.

FARUQEE, H. and LEE, J., 2008, "Global Dispersion of Current Accounts: Is the Universe Expanding?", working paper.

FELDSTEIN, M., 2008, "Resolving the Global Imbalance: The Dollar and the U.S. Savings Rate", *Journal of Economic Perspectives* 22:3, pp. 113-125.

FELDSTEIN, M. and HORIOKA, C., 1980, "Domestic Saving and International Capital Flows", *Economic Journal* pp. 314-329.

GRUBER, J.W. and KAMIN, S.B., 2007, "Explaining the Global Pattern of Current Account Imbalances", *Journal of International Money and Finance* 26, pp. 500-522.

HIGGINS, M. and KLITGAARD, T., 2007, "Financial Globalization and the U.S. Current Account Deficit", *Current Issues in Economics and Finance*, Federal Reserve Bank of New York, 13:11, pp. 1-7.

HOLINSKI, N., KOOL, C. and MUYSKEN, J., 2008, *Taking Home Bias Seriously: Absolute and Relative Measures Explaining Consumption Risk Sharing*, Working Paper RM/08/025, Maastricht University.

HOLINSKI, N., KOOL, C. and MUYSKEN, J., 2009, *International Portfolio Balance – Modeling the External Adjustment Process*, working paper Maastricht University, Maastricht.

IMF, 2009, *World Economic Outlook* (April).

KOOL and KEIJZER, 2009, "International Capital Mobility: linking the Feldstein-Horioka Puzzle to the Trade and equity Home Bias Puzzles", *Cambridge Journal of Regions, Economy and Society* 2:2, pp. 211-228.

KRUGMAN, P., 2007, "Will There Be a Dollar Crisis?", *Economic Policy*, July, pp. 436-467.

LANE, P.R and MILIESI-FERRETTI, G.-M., 2001, "The External Wealth of Nations: Measures of Foreign Assets and Liabilities for Industrial and Developing Countries", *Journal of International Economics* 55, pp. 263-294.

LANE, P.R. and MILESI-FERRETTI, G.-M., 2007, "The External Wealth of Nations Mark II", *Journal of International Economics* 73:2, pp. 223-250.

LANE P.R. and MILESI-FERRETTI, G.-M., 2009, "Where did all the Borrowing go? A Forensic Analysis of the U.S. External Position", *Journal of the Japanese and International Economies*, 23, pp. 177-199.

LAPP, S., 1996, *The Feldstein-Horioka Paradox: A Selective Survey of the Literature*, Kiel Working Paper no. 752, The Kiel Institute of World Economics.

LEWIS, K.K., 1996, "What Can Explain the Apparent Lack of International Consumption Risk Sharing?", *Journal of Political Economy* pp. 267-297.

LEWIS, K.K., 1999, "Trying to Explain the Bias in Equities and Consumption", *Journal of Economic Literature* pp. 571-608.

LEWIS, K.K., 2000, "Why Do Stocks and Consumption Imply such Different Gains from International Risk-Sharing?", *Journal of International Economics* pp. 1-35.

MILESI-FERRETTI, G.-M., 2009, "Changing Fortunes", *Finance and Development*, 46:1, pp. 20-28.

OBSTFELD, M., 2004, "External Adjustment", *Review of World Economics* pp. 541-568.

OBSTFELD, M. and ROGOFF, K., 2001, "The Six Major Puzzles in International Macroeconomics: Is there a Common Cause?", in: B.S. BERNANKE and K. ROGOFF, *NBER Macroeconomics Annual 2000*, Cambridge, pp. 339-390.

OBSTFELD, M. and TAYLOR, A.M., 2004, *Global Capital Markets: Integration, Crisis and Growth*, Cambridge University Press.

SUERF – Société Universitaire Européenne de Recherches Financières

SUERF is incorporated in France as a non-profit-making Association. It was founded in 1963 as a European-wide forum with the aim of bringing together professionals from both the practitioner and academic sides of finance who have an interest in the working of financial markets, institutions and systems, and the conduct of monetary and regulatory policy. SUERF is a network association of central bankers, bankers and other practitioners in the financial sector, and academics with the purpose of analysing and understanding European financial markets, institutions and systems, and the conduct of regulation and monetary policy. It organises regular Colloquia, lectures and seminars and each year publishes several analytical studies in the form of *SUERF Studies*.

SUERF has its full-time permanent Executive Office and Secretariat located at the Austrian National Bank in Vienna. It is financed by annual corporate, personal and academic institution membership fees. Corporate membership currently includes major European financial institutions and Central Banks. SUERF is strongly supported by Central Banks in Europe and its membership comprises most of Europe's Central Banks (including the Bank for International Settlements and the European Central Bank), banks, other financial institutions and academics.

SUERF Studies

1997-2010

For details of SUERF Studies published prior to 2009 (Nos. 1 to 22 and 2003/1-2008/5) please consult the SUERF website at www.suerf.org.

2009

2009/1 *Northern Rock: A Multi-Dimensional Case Study*, edited by Franco Bruni and David T. Llewellyn, Vienna, 2009, ISBN 978-3-902109-46-0

2009/2 *Current Trends in the Russian Financial System*, edited by Morten Balling, Vienna, 2009, ISBN 978-3-902109-47-7

2009/3 *Financing of SMEs in Europe (four papers)*, by Rym Ayadi, Beat Bernet and Simone Westerfeld, Vítor Gaspar and Nancy Huyghebaert, Vienna, 2009, ISBN 978-3-902109-48-4

2009/4 *Productivity in the Financial Services Sector*, edited by Morten Balling, Ernest Gnan, Frank Lierman and Jean-Pierre Schoder, Vienna 2009, ISBN 978-3-902109-49-1

2009/5 *Design, Structure and Implementation of a Modern Deposit Insurance Scheme*, by Beat Bernet and Susanna Walter, Vienna 2009, ISBN 978-3-902109-50-7

2010

2010/1 *Crisis Management at cross-roads – Challenges facing cross-border financial institutions at the EU level*, edited by Rym Ayadi, Morten Balling and Frank Lierman, Vienna 2010, ISBN 978-3-902109-51-4

De Nederlandsche Bank (DNB)

De Nederlandsche Bank, or DNB, champions financial stability and makes an active contribution to prosperity in the Netherlands.

To this end, DNB:

- cooperates with other national central banks within the Eurosystem to maintain price stability;
- aims for smooth, reliable and efficient settlement of payments;
- ensures that financial institutions have adequate financial buffers to meet their liabilities as well as sound corporate governance;
- contributes to good national and international decision-making in these areas by providing economic advice.

Authoritative knowledge and statistics are essential for the proper discharge of its responsibilities. DNB strives to fully integrate and anchor sustainability in its business operations and the performance of its tasks. As a knowledge institution, DNB is committed to sharing its knowledge with society and strives to operate effectively and efficiently.

RABOBANK

Rabobank Group is an international financial services provider operating on the basis of cooperative principles. It offers retail banking, wholesale banking, asset management, leasing and real estate services. Focus is on all-finance services in the Netherlands and on food & agri internationally. Rabobank Group is comprised of 152 independent local Rabobanks plus Rabobank Nederland, their central organisation, and a number of subsidiaries. The group entities maintain strong mutual ties. Overall, Rabobank Group has upwards of 60,000 employees (in FTEs), who serve about 9.5 million clients in 46 countries.

During the current crisis Rabobank has been the only large bank in the Netherlands to operate without government support. It has managed to remain profitable in both 2008 and 2009. In terms of Tier I capital Rabobank Group is among the world's 25 largest financial institutions, with a Tier 1 ratio of 13.8% (2009). Rabobank Group has the highest credit rating (triple A), awarded by well-known international rating agencies such as Standard & Poor's, Moody's Investor Service and Dominion Bond Rating Service. The origins of Rabobank lie in the local loan cooperatives that were founded in the Netherlands nearly 110 years ago by enterprising people who had virtually no access to the capital market.