

MONETARY POLICY, SOVEREIGN DEBT
AND
FINANCIAL STABILITY

THE NEW TRILEMMA

EDITED BY
DEEPAK MOHANTY



RESERVE BANK OF INDIA

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Foreword

As part of its Platinum Jubilee celebrations, the Reserve Bank of India held the first international research conference in February 2010. Drawing from the positive response to that conference, we decided to organize an international research conference on a biennial basis. Accordingly, the second international research conference was held during 1–2 February 2012 in Mumbai on the topic of ‘Monetary Policy, Sovereign Debt and Financial Stability: The New Trilemma’.

The global financial crisis and the Eurozone sovereign debt crisis which followed have changed the science and art of central banking in a fundamental way. The pre-crisis theology of central banking was centred around the pursuit of a single objective (price stability) by means of a single instrument (the short-term policy interest rate). It was assumed that price stability and macro-economic stability would automatically ensure financial stability. The crisis revealed to central banks how costly it was to have neglected financial stability as an explicit objective on the policy radar.

Post-crisis, central banks are confronted with the new trilemma – simultaneous pursuit of price stability, sovereign debt sustainability and financial stability. Is this trilemma a new impossible trinity? Possibly not. There is no theory which says that these objectives are inconsistent with one another. It can even be argued that the three objectives reinforce one other, and that together they sustain growth, thereby constituting not an impossible trinity, but a holy trinity of objectives.

These issues were deliberated at length in the Second International Research Conference. The conference was intellectually lively and

spirited, and generated rich insights into a variety of policy issues underlying the broad conference theme. This volume puts together the presentations at the conference and the summary of discussions with the aim of wider dissemination.

The quality of chapters in this compendium reflects the scholarship and analytical insights of the participants. Our sincere thanks to all of them. My particular thanks to Dr Subir Gokarn, former Deputy Governor, who guided the intellectual preparation for the conference with passion and professionalism. Mr Deepak Mohanty, Executive Director and his team have worked hard to organize the conference and put together this volume with great competence and diligence, something that we have now routinely come to expect of them.

I hope this conference compendium will deepen our understanding of the issues underlying the new trilemma and further the debate thereon.

Duvvuri Subbarao
Former Governor
Reserve Bank of India

Introduction

This volume brings together the papers presented at the Second International Research Conference of the Reserve Bank of India in February 2012. Following the global financial crisis, the unprecedented monetary policy easing and fiscal stimulus across the advanced economies (AEs) and the emerging market economies (EMEs) helped restore the confidence in the financial system. However, there were concerns relating to the fragile nature of recovery coupled with the resurrection of sovereign debt problems and financial instability issues.

The evolving challenge for central banks, therefore, was to restore normalcy in the conduct of monetary policy, ensure sustainability of sovereign debt and achieve financial stability in a coordinated and efficient manner. Thus, the theme of the Second International Research Conference was chosen as 'Monetary Policy, Sovereign Debt and Financial Stability: The New Trilemma'. The Reserve Bank of India brought together veteran central bankers, academicians, policymakers, financial regulators and supervisors and private sector experts on a common platform to share their experiences and thoughts and to explore solutions through the second conference.

The world economy has moved a great deal since the Second International Research Conference. Global economic prospects have improved. Growth in EMEs has picked up steam. However, recovery in AEs remains subdued. There appeared to be a growing divergence between the United States and the Euro area.

Though the world economy moved towards recovery, the issues and challenges, which were dominant in the policy circle at the time of second conference, continued to engage the interest of policymakers

and academicians alike. Fiscal activism as a crisis response seems to have paved the way for fiscal consolidation across countries and is considered essential not only for ensuring financial stability but also for sustaining growth. This has become all the more important as overburdening the monetary policy with seemingly conflicting objectives runs the risk of undermining its primary role of ensuring price stability.

The received wisdom from the global policy circles as well as India's past experience with fiscal consolidation enabling higher growth in pre-crisis years have convinced domestic policymakers on the need for staying firm on a course of more prudent fiscal policy for sustaining high growth and macro financial stability. In this context, formal and more active coordination among various authorities responsible for financial stability, as emphasized in the post-crisis period, assumes critical importance. Keeping in view the continuing relevance of the ideas mooted at the second conference, it was felt appropriate to share the papers with a larger audience and hence, this volume.

The volume commences with the keynote address delivered at the conference by former Governor Subbarao. He characterizes the interaction among monetary policy, sovereign debt and financial stability as a 'holy trilemma' and poses the fundamental question: how do the three objectives underlying the trilemma reinforce and conflict with one another? He sees the likely return of fiscal dominance of monetary policy as a reality for central banks. According to him, fiscal responsibility is more than a question of monetary policy independence – it is a question of sustaining macroeconomic stability. Governments and central banks in each jurisdiction need to define the country-specific arrangement, subject to certain broad tenets. One, the fundamental responsibility of central banks for price stability should not be compromised; two, central banks should have a lead, but not an exclusive responsibility for financial stability; three, the central bank's responsibility for sovereign debt sustainability should only be restricted to protecting financial stability; four, in the matter of ensuring financial stability, the government should normally leave the responsibility to the regulators and assume an activist role only in time of crises. It is

possible that the short-term policies aimed at price stability, financial stability and sovereign debt sustainability could, at times, run counter to policies required for promoting growth. Yet growth achieved at the cost of the objectives of the new trilemma cannot be sustained. He emphasizes the role of communication in explaining the policy intent in addressing the trilemma.

The second chapter by Deepak Mohanty discusses the efficacy of interest rate channel in monetary policy transmission in India. The chapter recognizes that in India, as in most countries, monetary policy framework has evolved in response to and in consequence of financial developments, openness and shifts in the underlying transmission mechanism. The chapter presents a phase-wise evolution of monetary policy framework in India and explains how the focus of the Reserve Bank's policy has shifted from credit planning to monetary targeting to multiple indicators approach. The chapter indicates that with the development of financial markets and gradual deregulation of interest rates, monetary policy operating procedure in India in the recent years has evolved towards greater reliance on interest rates to signal the stance of monetary policy. Establishing a long-run equilibrium relationship across markets, the chapter finds that changes in policy rate transmit through the term structure of interest rates, though the intensity of transmission varies across financial markets. Following a quarterly structural vector auto-regression (SVAR) model, it observes that policy rate increases have a negative effect on output growth with a lag of two quarters and a moderating impact on inflation with a lag of three quarters and the overall impact on inflation persists through 8–10 quarters.

In the third chapter, Yung Chul Park attempts to examine the rationale behind, and the scope for macro-prudential policy in the context of EMEs. He also clarifies some of the analytical as well as operational issues related to the construction of a macro-prudential policy framework for financial supervision and regulation, in particular, interactions between monetary and macro-prudential policy. He suggests that since the financial landscape has changed a lot in recent

years, there is a need to strengthen the foundation of the domestic financial system to improve its resilience to external shocks and to develop new policy instruments that could complement monetary and fiscal policy in safeguarding the economy against financial instability. Notwithstanding that central banks need to have the mandate for financial stability, the transfer of supervisory oversight and the focus of central banks on inflation targeting appear to have created a vacuum of macro-prudential supervision as a constituent part of an overall macroeconomic policy framework for financial stability. The author suggests that the construction of an overall framework for macro-prudential policy should be managed jointly by monetary, fiscal and supervisory authorities.

The fourth chapter by Stephen G. Cecchetti and Enisse Kharroubi questions one of the principal conclusions of modern economics that finance is good for growth as it reduces transaction costs, raises investment directly and improves the distribution of capital and risk across the economy. For a sample of 50 advanced economies (AEs) and emerging market economies (EMEs) over the past three decades, 1980–2009, the chapter investigates how financial development, both the size and growth of the financial system, affects growth both at the country and at the industry level. In a panel regression framework, the chapter finds that at low levels, a larger financial system goes hand in hand with higher productivity growth. However, after a point, which many AEs crossed long ago, more banking and more credit lower growth. When private credit to GDP ratio exceeds the threshold of 100 per cent, financial sector could be a drag on growth by reducing productivity growth. Examining the impact of growth in finance on the real economy across a sample of 21 AEs, the chapter finds that as compared with a country where financial sector employment is stable, a typical financial boom – employment growth of 1.6 per cent per year – reduces growth in aggregate GDP per worker by roughly 0.5 percentage point. Thus, the chapter observes that faster growth in finance beyond a level is bad for aggregate real growth and financial booms are bad for trend growth. This evidence, together with the

recent experience of financial crisis, made the authors conclude that there is a pressing need to reassess the relationship of finance and real growth in modern economic systems.

The fifth chapter by Jørgen Elmeskov and Douglas Sutherland provides an analysis of the short- and long-term implications of reducing government debt levels for growth in OECD countries. High debt can adversely affect growth mainly through high cost of capital, distortionary taxes, inflation, volatility in policy and lower capital-labour ratio. Even though improvement in primary balances is one of the viable options to influence debt dynamics, the pace of consolidation should take into account the impact of fiscal retrenchments on aggregate demand. In the short run, fiscal consolidation can adversely impact growth. In the long run, however, fiscal consolidation should not only have limited detrimental effect on growth but also not conflict with other policy objectives.

In the sixth chapter, Benjamin M. Friedman questions the generally held perception that monetary policy with low short-term interest rate pursued largely in the first half of 2000s in the US was one of the most important reasons for the global financial crisis. He observes that the link between the low short-term interest rates and the housing bubbles seems plausible, but lacks empirical support. The chapter suggests looking into the three building blocks of macro-economic and financial policy-set in order to prevent the recurrence of crisis or understand the dynamics of the crisis as the pursuance of two of the three policy actions are incompatible with financial stability. The three elements of the policy-set are: (i) monetary policy centred on an active response of short-term interest rates to observed and anticipated movements in price inflation and also to real economic activity, (ii) an intermediation system built on banks and other deposit-type institutions with significantly levered balance sheets and with substantial freedom both to invest in a wide variety of financial assets and to finance those assets with mismatched liabilities and (iii) asset markets characterized by open entry, free trading and few restrictions on how non-financial investors finance their positions. Prof. Friedman articulates that if the

above-mentioned policy mix sows the seeds of the crisis, there is a need to change the policy mix. He underscores the need to undertake empirical and conceptual research by central banks apart from academics to explore how well the existing financial market structures are performing their fundamental economic functions.

The seventh chapter by William R. White investigates the origins of the current economic and financial crises to draw policy conclusions especially on two aspects: what has been the role of policies followed so far in leading to the crisis and what sort of policy changes are required to avoid similar problems in the future? He argues that the global economy has been on an unsustainable path for many years, partly due to the narrow focus on short-term growth. The chapter highlights many policy errors on the part of not only AEs and EMEs but also of the International Monetary System (IMS) during the phase leading up to the great moderation. The chapter notes that errors on the part of AEs were in terms of overly easy monetary policy and asymmetric policy responses during upswings and downswings. On the other hand, policy errors in EMEs largely emanated from the 'fear of floating', resulting in currency intervention, and often easier domestic monetary policies. Such policy errors led to a build-up of large imbalances globally. The IMS was at fault by allowing such imbalances to persist. The chapter suggests the need for fundamental policy changes, relying much more on supply-side reforms than simple demand-side stimulus and calls for a new 'macro financial' stability framework.

The eighth chapter by Parthasarathi Shome traces the course of public debt growth in AEs, demonstrates the spillover of the debt crisis into financial markets and examines the nature of measures taken by the concerned central banks. He argues that the deviation from long-held fiscal austerity in the form of the so-called 'fiscal stimulus' as a crisis response partly resulted in the scaling up of debt levels in the US and Euro area. The problem was further compounded by the fragile recovery and increasing expenditure on healthcare and pensions. Arguing that further quantitative easing is unlikely to raise the money multiplier and fiscal relaxation is unlikely to bolster public

confidence and revive growth, the author advocates fiscal austerity through strong IMF surveillance to address the European sovereign debt crisis and policies aimed at containment of consumption in these economies. He indicates that EMEs made a severe error in going along with AEs in adopting such 'fiscal stimulus' policies to recover from the crisis. In this regard, the chapter notes that there is no proof that India needed fiscal stimulus for recovering from the crisis by reversing the fiscal stance adopted under the Fiscal Responsibility and Budget Management (FRBM) Act.

In the ninth chapter, Barry Eichengreen, Eswar Prasad and Raghuram Rajan trace the connections among different facets of central banking. The authors argue that in the post-global financial crisis period, the exclusive focus on price stability by central banks has been challenged. Recognizing that financial stability can no longer be seen as outside the direct ambit of monetary policy, and that cross-border spillovers have increased in scope and size and associated challenges for central banks, the authors underscore the need for an alternative framework in the post-crisis period. Accordingly, authors set out a strategy for incorporating financial stability concerns in the implementation of monetary policy without diluting the price stability objective. In particular, they recommend that whenever a central bank perceives that changes in current financing conditions are likely to be disruptive for the economy, it should lean against the wind, even at the cost of compromising on the inflation-targeting objective. Among other policy recommendations, the role of macro-prudential tools to supplement the existing micro-prudential measures and regular meetings of systemically significant central banks to assess the implications of their policies for global liquidity, leverage, and exposures are also emphasized.

The last chapter by Frank Smets and Mathias Trabandt discusses the interaction between high government debt and monetary policy in a global macroeconomic environment marked by crisis of confidence. It is argued that counter-cyclical fiscal measures undertaken in AEs have

pushed the fiscal parameters of major AEs increasingly towards the unsustainable territory and conventional monetary policy has reached its limits. Functioning of financial markets is constrained by the near-zero short-term interest rates and the rising credit risk of holding sovereign papers. This is also affecting the monetary policy transmission as has been evident in the Euro area. The authors are of the view that central banks may face constraints to ensure sovereign debt sustainability.

Let me now briefly highlight the major takeaways out of this volume. Firstly, the new trilemma is a reality, and fiscal discipline is critically important for financial stability and price stability. Secondly, interaction between sovereign debt and monetary policy is an important determinant of market confidence. A comprehensive fiscal exit strategy should explicitly recognize the objective of a sustainable public debt ratio and policies that should underpin a fiscal adjustment path. Thirdly, the right balance between growth in the financial sector and real sector is important to prevent imbalances. Even though warning signals always flash before the crisis, often these signals are ignored. There is merit that leaning against imbalances could be less costly than cleaning up later. Finally, macro-prudential measures are useful, but their effectiveness in preventing a crisis is yet to be tested. Certainly these tools need to be fine-tuned. These are some of the lessons which need to be appreciated by all policy makers – present or future.

In my endeavour of bringing out this volume, the Division of Reports and Knowledge Dissemination, Department of Economic and Policy Research acted as the editor's secretariat and its contribution is gratefully acknowledged. In particular, I would like to record my sincere appreciation of the painstaking work by Sanjay Hansda, Rajeev Jain, Binod B. Bhoi, Subrat Kumar Seet, John V. Guria and Dipak Chaudhari. I also thank B. M. Misra and Amitava Sardar for their valuable suggestions. I do hope that the readers find this volume informative and useful for reference.

Deepak Mohanty

Price Stability, Financial Stability and Sovereign Debt Sustainability

CHAPTER

1

Policy Challenges from the New Trilemma

Duvvuri Subbarao

Chapter Theme

The global financial crisis followed by the Eurozone debt crisis has changed the theology of central banking in a fundamental way. The orthodoxy of central banking before the 2008 crisis was that of single objective – price stability and single instrument – short-term interest rate. Although most central banks deviated to different extents from this minimalist model, this increasingly came to be considered the Holy Grail.

The crisis came as a powerful rebuke to central banks for having neglected financial stability in their single-minded pursuit of price stability. By the time of the first conference organized by the Reserve Bank in 2010, a consensus was developing around the view that financial stability has to be within the explicit policy calculus of central banks. However, opinions were divided on the precise nature of institutional arrangements for maintaining financial stability.

Fast forward to 2011–12. Even as central banks are grappling with balancing the demands of price stability and financial stability, there is now yet another powerful assault on central bank orthodoxy arising from the big elephant in the room – the Eurozone sovereign debt crisis. The European Central Bank (ECB) is being called upon to bend and stretch its mandate to bail-out sovereigns who have forfeited the

confidence of markets. Actually, that is an understatement. In reality, the ECB is being challenged on why it is, to use an Indian word, being so *brahminical* about its mandate when the world around it is collapsing. The argument, in its essence, is that if a central bank is committed to financial stability, it cannot ignore the feedback loop between financial stability and sovereign debt sustainability, and, by extension, therefore, it has to be mindful of sovereign debt sustainability concerns.

What do these trends engendered by the crisis indicate? In particular, is it the case that the mandate of central banks is set to expand from the single objective of price stability to multiple objectives of price stability, financial stability and sovereign debt sustainability? Can central banks simultaneously support all these three objectives and do so efficiently? That in essence is the new trilemma.

The new trilemma triggers several questions. How do the three objectives underlying the trilemma reinforce each other, and in what ways do they conflict with each other? What is their impact on growth? Is the trilemma a phenomenon exclusive to times of crisis or does it manifest in normal situations as well? What is the nature and extent of the responsibility of central banks for each of these objectives? Are central banks equipped to handle these additional responsibilities? And finally, what does this expanded mandate mean for the effectiveness and autonomy of central banks?

That indeed is a long list of questions. The purpose of this chapter is to think through these weighty questions centred on this new trilemma.

Is this Indeed a Trilemma?

The Reserve Bank deliberated internally on whether this evolving challenge for central banks would indeed qualify as a trilemma. One view was that this is not strictly a trilemma as there is no theory which says that price stability, financial stability and sovereign debt sustainability cannot be simultaneously obtained. The opposing view was that what central banks have at hand is indeed a trilemma in as much as there can be clear tensions between the objectives underlying the new trilemma, and central banks may not be able to determine,

with any degree of exactitude, what *inter se* priority must be accorded to each of the three objectives under different sets of circumstances. So, is this a trilemma or not? To compound the search for an answer, the word 'trilemma' has not made it to all standard dictionaries yet. So, one may permit a little indulgence into the world of trilemma.

The World of Trilemma

Epicurus, the Greek Philosopher who lived around 300 BC, was possibly the first to use the concept of a trilemma to reject the idea of an omnipotent God. The distinction of being the first to actually use the word 'trilemma' goes perhaps to the seventeenth-century English non-conformist clergyman, Philip Henry, who recorded in his diary, 'We are put hereby to a Trilemma, to turn flat Independents, or to strike in with the conformists, or to sit down in former silence'. Arthur C. Clarke, the British science fiction writer, cited a trilemma in trying to achieve production quickly and cheaply while also maintaining high quality, leading to the quip: 'Quick, Cheap, Good: Pick two?'. In public choice theory, there is the trilemma of juggling three priorities – coverage, cost and choice – when offering a public service.

If one turns to economics, one will see that trilemmas have indeed proliferated. Dani Rodrik (2007) argued that if a country wants more of globalization, it must either give up some democracy or some national sovereignty. Niall Ferguson (2009) highlighted the trilemma of a choice between commitment to globalization, social order and to a small state (meaning limited state intervention). In one of his Financial Times columns, Martin Wolf (2010) spoke about the US Republican Party's fiscal policy trilemma – the belief that large budget deficits are ruinous, a continued eagerness to cut taxes and an utter lack of interest in spending cuts on a large-enough scale. Then, there is the Earth Trilemma (EEE), which posits that for economic development (E), increased energy expenditure is required (E), but this raises the environmental issue (E).

The trilemma more directly relevant to the theme of the chapter is that of financial stability trilemma put forward by Dirk Schoenmaker (2008), explaining the incompatibility within the Eurozone of a stable financial system, an integrated financial system, and national financial

stability policies. By far, the most high-profile current trilemma, as per some analysts, is the Eurozone trilemma – the seeming irreconcilability between its three wishes – a single currency, minimal fiscal contribution to bail-outs, and the ECB’s commitment to low inflation.

The Old Trilemma

Of more recent trilemmas in economics mentioned in this chapter, the prima donna of all of them is Mundell’s ‘impossible trinity’. This old trilemma asserts that a country cannot simultaneously maintain all three policy goals of free capital flows, a fixed exchange rate and an independent monetary policy. The impossible trinity, as students of economics have learnt for over a half century, has a strong theoretical foundation in the Mundell–Fleming Model developed in the 1960s.

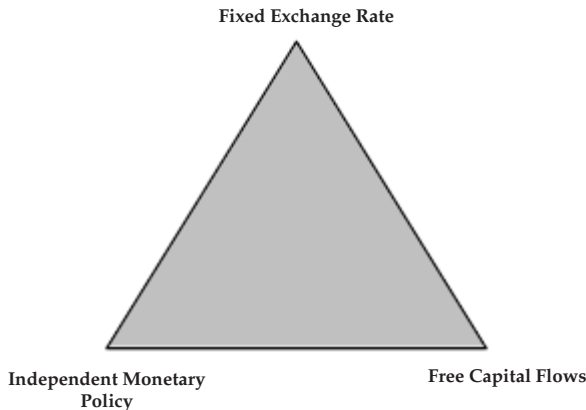


Figure 1.1: Impossible Trinity

The choices the world made under the impossible trinity varied over time. Under the gold standard, exchange rates were fixed and capital could move around, but central banks were forced to adjust interest rates to ensure that they did not run out of reserves. This could lead to pressure on the real economy, and a lot of booms and busts.

Under Bretton Woods, fixed exchange rates (with occasional adjustments) and independent monetary policy were pursued, but capital mobility was highly restricted. Thirty years ago, Indians

couldn't take out more than \$20 abroad, irrespective of the purpose of the trip. The Bretton Woods system broke down under the weight of fixed exchange rates and the world moved to largely floating exchange rates. Capital has flowed freely a round the world.

In the post-Bretton Woods era, countries have made different choices. The most common case, typical across advanced economies, is to give up on a fixed exchange rate so as to run an open economy with an independent monetary policy. On the other hand, economies that adopt a hard peg give up on independence of monetary policy. Examples include the currency boards set up by Hong Kong and, for a time, Argentina. More recently, responding to a rapid appreciation of the Swiss Franc as a result of the safe haven effect, Switzerland declared its commitment to defend a pre-announced exchange rate.

History is replete, also, with examples of countries aiming to achieve all three goals at the same time, and failing to do so, often in a disorderly way. Thailand's decision to abandon the hard peg against the US dollar in July 1997 is a classic example.

Notwithstanding its real life validation, it is not as if Mundell's 'Impossible Trinity' is inviolable. Many of the assumptions underlying this model do not often hold; indeed the new open economy macroeconomy models that build in price rigidities and monopolistic competition demonstrate policy dynamics that are quite different from those built in the Mundell–Fleming tradition. It is also not the case that countries are forced into corner solutions at the nodes of the impossible trinity triangle. As it happens, reflecting the forces of globalization and their asymmetric impact, many emerging economies have opted for middle solutions.

Impossible Trinity to Holy Trinity

In the context of this chapter, the new trilemma – the simultaneous pursuit of price stability, financial stability and sovereign debt sustainability – is possibly not a new impossible trinity. There is no theory which says that these objectives are inconsistent with one another. It can even be argued that the three objectives reinforce one

another, and that together they sustain growth, thereby constituting not an impossible trinity, but actually a holy trinity, of objectives.

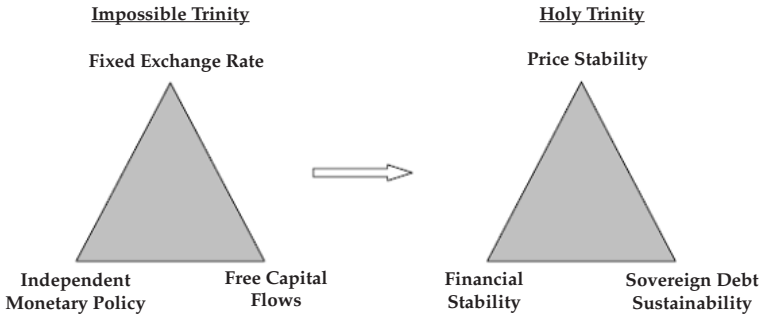


Figure 1.2: Impossible Trinity and Holy Trinity

That does not, by any means, imply that the holy trinity of objectives can always be achieved simultaneously or once achieved can be maintained as such indefinitely. There would be tensions and trade-offs, especially in the short term. In particular, the tensions materialize with brutal force in a state of disequilibrium – when inflation is off target, the financial system is fragile and public debt is ballooning. To the extent these tensions have to be managed, the policy problem qualifies as a trilemma.

The Many Ways in Which the New Trilemma Plays Out

Policies in pursuit of the three objectives under the trilemma interact in complex, and often unintended ways. Sometimes they are supportive of each other; at other times, they may run counter to each other. More perplexingly, the tensions and trade-offs may be different in times of crisis than in normal times.

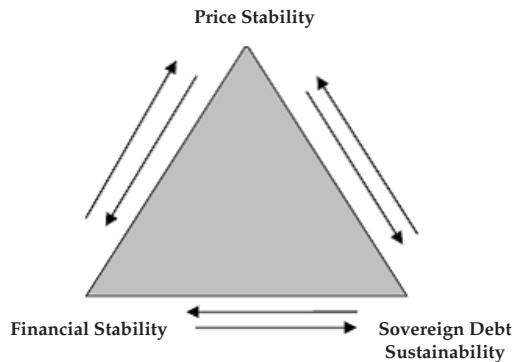


Figure 1.3: New Trilemma

This may be illustrated by citing some examples from global experience, including recent experience. Given the three objectives underlying the new trilemma, and the two-way directions in which they can interact, there are in total six ‘cause and impact’ bilateral interactions. These will be considered one by one in the chapter.

Price Stability —► Financial Stability

Before the global financial crisis, the stereotypical view was that price stability and financial stability complement each other, *i.e.*, monetary policy and policies for financial stability are mutually reinforcing. The crisis has proved that wrong. Note that the global financial sector came to the brink of collapse in the midst of a period of extraordinary price stability.

Indeed the experience of the crisis has prompted an even stronger assertion – that there is a trade-off between price stability and financial stability. In other words, the more successful a central bank is with price stability, the more likely it is to imperil financial stability. The argument goes as follows: the extended period of steady growth and low and stable inflation during the Great Moderation lulled central banks into complacency. Only with the benefit of hindsight is it now clear that the prolonged period of price stability blindsided policymakers to the cancer of financial instability growing in the underbelly.

An even more recent example of a conflict between policies for financial stability and price stability is of the ECB reversing its crisis-driven expansionary stance by raising interest rates twice during April–July 2011. The ECB justified this on the argument of stemming the underlying inflationary pressures, but many criticized this move as being premature and as clearly unhelpful to restoring financial stability. Of course, it is well known that the ECB reversed these hikes during November–December 2011 in response to the Eurozone slowdown.

Financial Stability —► Price Stability

The focus is now on the interaction in the reverse direction. Whether policies aimed at financial stability can affect price stability is a debate

that has continued on all through the period of management of the crisis. Many analysts have argued that the extraordinary monetary expansion, especially by the Fed, to bring interest rates to the Zero Lower Bound (ZLB) and following it up with two rounds of 'Quantitative Easing' (QE), all aimed at restoring financial stability, may actually be sowing the seeds of inflation. The argument goes that since the inflationary impact of easy monetary policies is difficult to see in real time, the Fed risks going overboard with monetary easing thereby jeopardizing future price stability.

There is also the illustration from emerging economies of policies for financial stability affecting price stability. During the crisis, EME central banks eased monetary policy to provide relief to the financial sector, but this also saw inflation quickly resurging when recovery started.

Financial Stability → Sovereign Debt Sustainability

The management of the crisis offered an important lesson on how policies aimed at restoring financial stability could impair sovereign debt sustainability. By far, the most obvious illustration of this link is the cost of bail-outs of failing financial institutions, accompanied by 'fiscal stimulus', to prevent the financial sector problems from causing overall economic activity to collapse. The fiscal action was unquestionably necessary to restore financial stability. But the net impact need not always be benign. There are circumstances under which fiscal expansion, in support of financial stability, can threaten sovereign debt sustainability. That will happen if the sovereign is already highly indebted and the recovery is not quick or robust enough. Governments will then see their revenues falling, and need to borrow to bridge the fiscal gap, and can potentially get trapped in a self-reinforcing adverse fiscal feedback loop eventually jeopardizing their sovereign debt sustainability.

Sovereign Debt Sustainability → Financial Stability

For transmission of shocks from the sovereign to the banking system, the evolving situation in the Eurozone is clearly the most glaring example. Consider Greece, where banks are being asked to share the

burden of bailing out the government, the so-called private sector involvement (PSI), so that sovereign debt could be brought down to sustainable levels. But this will affect their collective viability and potentially threaten broader financial stability. There has been acrimony over whether the PSI is voluntary or involuntary. For the purpose of this issue, that debate is a technicality; it does not alter the basic contours of contagion from sovereign debt to financial stability.

The ECB's new term repo – Long-Term Refinancing Operations (LTRO) window offers another example of how sovereign debt sustainability concerns can affect financial stability. This new window offers banks three-year money at the repo rate to encourage them to use that money to lend to sovereigns, taking advantage of the arbitrage opportunity. But this financial engineering is a fragile and potentially problematic arrangement. Banks will need to post additional collateral with ECB if the bonds they offered fall in value or suffer a credit downgrade. For precisely the same reasons – fall in value and credit downgrade – banks will need to provide additional capital against monies they have lent to sovereigns. This could put banks on a collateral spiral and erode overall financial stability.

Sovereign Debt Sustainability → Price Stability

The most obvious route for sovereign debt concerns impinging on price stability is through the monetization of government debt. Central banks do, of course, resort to open market operations (OMOs) – buying and selling government paper – for purposes of liquidity management. But if the motivation for the OMO is to help out a fiscally vulnerable sovereign or to reduce the cost of borrowing for the sovereign, central banks could end up holding price stability hostage to sovereign debt concerns.

Fiscal concerns can dominate monetary policy in other less dramatic ways. In the years before the crisis, an increasing number of governments were voluntarily adopting fiscal responsibility rules, thereby allowing room for autonomous monetary policy. These rule-based fiscal regimes unravelled during the crisis as both governments and central banks implemented expansionary policies

in close coordination. While such coordination during the crisis was not questioned except by extreme purists, now in the recovery period, several fundamental concerns are resurfacing.

At the heart of these concerns is whether monetary policy is once again becoming hostage to fiscal compulsions. The specifics of the debate vary but the basic issues are similar. In the US, the debate is over the trade-off between short-term fiscal stimulus and long-term fiscal consolidation. In the Euro area, the question is about the shared benefits of a monetary union without the shared responsibilities of a fiscal union. In India, the question has been whether the OMOs conducted by the Reserve Bank to manage systemic liquidity are acting as disincentives for fiscal discipline. The questions all around are: are central banks being forced beyond their comfort zone to subordinate their monetary policy stance to the government's fiscal stance? Aren't the so-called unconventional measures, in reality, quasi-fiscal measures? Are central banks, in the process, compromising their basic commitment to price stability?

Price Stability —► Sovereign Debt Sustainability

There are several ways in which policies aimed at price stability can influence sovereign debt sustainability. Higher interest rates, necessary to combat inflation, raise the costs of debt to the government. Also, if the government has large subsidies on its budget, as do many emerging and developing economies, inflation could raise the cost of subsidies thereby increasing the borrowing need of the government. On the other hand, governments with large debts may not actually mind a bit of inflation as it affords them an opportunity to inflate away some of the debt.

This chapter details the tensions and trade-offs between the three objectives underlying the new trilemma. The examples that have been provided are, by no means, exhaustive but are intended to illustrate the complex policy challenges they pose to central banks.

Four Questions Underlying the New Trilemma

This section details some important questions that central banks will confront in managing the new trilemma. In particular, four questions are raised.

Question 1: Is a Return of Fiscal Dominance of Monetary Policy Visible?

This question has surfaced with vigour in the context of the Eurozone crisis. The ECB claims that its bond purchase programme is aimed at restoring liquidity and improving monetary transmission. But many analysts believe that this is a thinly veiled attempt to shore up sovereign borrowing and that the ECB is actually acquiescing in fiscal dominance.

Although this tension between the central bank mandate and sovereign debt sustainability is presently being played out in Europe, it is not new; nor is it unique to Europe. The seventy odd years since the Great Depression saw a famous rivalry between fiscal and monetary policies for influence. Historically, central banks suffered from fiscal dominance since they had to acquiesce in governments 'borrowing as much as required at as low a cost as possible'.

This state of affairs started changing in the 1980s, with a wave of support for central bank independence arising largely in response to the damage inflicted by the stagflation of the 1970s and the clear lesson that high inflation is detrimental to sustainable growth. So, fiscal dominance gradually yielded to independent central banks, free of short-term compulsions, targeting largely, and in some cases exclusively, price stability. Now it seems a reversal of that trend is occurring with central banks being called upon to mind sovereign debt sustainability concerns.

Fiscal dominance manifests through the central bank acquiescing in the fiscal stance of the government. This usually happens through monetization of debt through the central bank's bond buying programme. Central banks typically conduct OMOs more as reverse transactions (repos) for liquidity management purposes in line with their monetary policy stance and intermediate targets. In that case, they should be seen as pure monetary policy operations. But at times, OMOs could be motivated by the objective of providing liquidity to support government borrowing or of reducing the yield on treasury bonds to enhance debt sustainability. It then becomes a case of acquiescence in fiscal dominance. There is often only a thin line, and

the interpretation of the motivation for outright OMOs could vary depending on the circumstances.

In the presence of large sovereign borrowing that makes the government's fiscal stance unsustainable, central banks typically have little choice. If they do not conduct OMOs to bring systemic liquidity within reasonable limits, they risk losing control over financial stability. If they do conduct OMOs, they risk losing control over price stability. What this really says is that fiscal responsibility is much more than a question of whether monetary policy is independent or not. It is a question of sustaining macro-economic stability.

Question 2: Will the Management of the New Trilemma Erode the Autonomy and Accountability of Central Banks?

The much prized autonomy of central banks has come under assault post-crisis with an influential view gaining ground that one of the principal causes of the crisis was the unbridled autonomy of central banks. The standard argument for central bank autonomy is that it enhances the credibility of the central bank's inflation management credentials. Monetary policy typically acts with a lag, and price stability therefore has to be viewed in a medium-term perspective. Having autonomy frees the central bank from the pressure of responding to short-term developments, deviating from its inflation target and thereby compromising its medium-term inflation goals.

Now that the importance of central bank autonomy in monetary policy has come to be largely accepted, the question is whether additional responsibilities underlying the new trilemma will affect that autonomy and how this new situation will also affect the accountability structures of the central banks. It may be useful to take stock of the apprehensions in this regard.

For overseeing systemic stability, new governance structures have emerged after the global crisis. These include the Financial Services Oversight Council (FSOC) in the US, the Financial Policy Committee (FPC) in the UK and the European Systemic Risk Board (ESRB) in the EU. Here in India, there is the Financial Stability and Development Council (FSDC). The precise institutional arrangements vary, but across all of them, central banks have a lead responsibility.

With these new institutional arrangements for financial stability in place, the question of autonomy has acquired an additional dimension. Note that central bank autonomy has worked because they could keep at arm's length from the governments. But once a coordination mechanism is in place, these barriers may melt away. Also, even if that is what the book says, it may be difficult to straitjacket the discussion at the coordination forum to financial stability. It has been found, there are no 'pure' financial stability issues; they are all interconnected. A discussion on financial stability could very well lead to a discussion on monetary policy. What then of the autonomy of the central bank? This apprehension, as anyone can appreciate, is non-trivial.

If responsibility for sovereign debt sustainability is added to this already complex situation, the reason for apprehension about the threat to the autonomy of central banks becomes more obvious. Sovereign debt is a quintessentially political subject, and as noted earlier, the very foundation of central bank autonomy is justified on the need to free monetary policy from fiscal dominance. By requiring central banks to be mindful of sovereign debt sustainability concerns as part of the 'new trilemma', is the hard won gain of freedom from fiscal compulsions being compromised? But look at it also from the opposite perspective. Given that investor trust in public debt is part of the foundation of a nation-state, is it realistic for a central bank to remain indifferent to sovereign debt sustainability?

The new trilemma also poses questions for central banks on the accountability front. With a single objective of price stability, the deliverable could be precisely defined, the outcome accurately measured, and accountability clearly extracted. Multiple objectives, and as seen, with tensions and trade-offs between them, can diffuse and erode this accountability mechanism. The central bank can always explain away any failure on one front as a result of policies to defend another front.

There are no easy answers to these apprehensions about the impact of the new trilemma on central bank autonomy and accountability. Governments and central banks in each jurisdiction will have to define the nature and extent of the latter's responsibility for financial stability

and sovereign debt sustainability. There are certain tenets that must inform this process. First, the fundamental responsibility of central banks for price stability should not be compromised. Second, central banks should have a lead, but not exclusive, responsibility, for financial stability. Third, the boundaries of central bank responsibility for sovereign debt sustainability should be clearly defined. Fourth, in the matter of ensuring financial stability, the government must normally leave the responsibility to the regulators, assuming an activist role only in times of crisis.

Question 3: Does the Pursuit of the New Trilemma Militate against Growth?

The short answer to this question is 'no'. It is possible that in the short term, policies aimed at price stability, financial stability and sovereign debt sustainability could, at times, run counter to policies required for promoting growth. But growth achieved at the cost of the objectives of the new trilemma cannot be sustained. What can be sustained is only growth that is consistent with these objectives. So, some sacrifice ratio may be operative in the short term, but in the medium term, there is no trade-off between sustainable growth and maintaining the objectives of the new trilemma.

This can be illustrated with reference to the debate that played out quite actively in India all of last year around the growth–inflation trade-off. Inflation was ruling all through the year in the range of 9–10 per cent. To combat this, the Reserve Bank has had to tighten monetary policy – raising rates, as all the critics are fond of saying repeatedly – a record total of 13 times. While inflation did not show any downward trend till late in the calendar year 2011, growth has certainly moderated. The Reserve Bank's latest projection for growth for FY12 is 7 per cent, down from 8.4 per cent in FY11. The criticism has been that this could not bring inflation down but only ended up hurting growth. This is not the occasion to enter a defence of our position. But in the context of this chapter, the criticism throws up an important issue on the growth–inflation trade-off.

Evidence from empirical research suggests that the relationship

between growth and inflation is non-linear. At low inflation and stable inflation expectations, there is a trade-off between growth and inflation. But above a certain threshold level of inflation, the trade-off disappears, this relationship reverses, and high inflation actually starts taking a toll on growth. Estimates by the Reserve Bank using different methodologies put the threshold level of inflation in the range of 4–6 per cent. With Wholesale Price Index (WPI) inflation ruling above 9 per cent till recently, this threshold has been crossed. At this high level, inflation is unambiguously inimical to growth; it saps investor confidence and erodes medium-term growth prospects. The Reserve Bank's monetary tightening all through last year was accordingly geared towards safeguarding medium-term growth even if it meant some sacrifice in near-term growth.

The debate on the trade-off between financial stability and growth runs along roughly similar lines. Post-crisis, regulation of financial institutions is being tightened. In particular, under the Basel III package, banks will be required to hold higher capital, better quality capital and also build up capital and liquidity buffers. What does this mean for growth?

A Bank for International Settlements (BIS) study, undertaken by a group led by Stephen Cecchetti, estimates that a one percentage point increase in the target ratio of tangible common equity (TCE) to risk-weighted assets (RWA) phased in over a nine-year period reduces output by close to 0.2 per cent. The study argues, however, that as the financial system makes the required adjustment, these costs will dissipate and then reverse after the adjustment period, and the growth path will return to its original trajectory. A Basel Committee study estimates that there will be net positive benefits from Basel III because of the reduced probability of a crisis and reduced volatility in output in response to a shock. An Institute of International Finance (IIF) study, however, estimates a higher sacrifice ratio – that the G3 (US, Euro Area and Japan) will lose 0.3 percentage points from their annual growth rates over the full ten-year period 2011–20.

What are the implications of these numbers relating to growth sacrifice for emerging market economies (EMEs)? The example of

India can be taken in this regard. Admittedly, the capital-to-risk-weighted asset ratio (CRAR) of our banks, at the aggregate level, is above the Basel III requirement although a few individual banks may fall short and may have to raise capital. But capital adequacy today does not necessarily mean capital adequacy going forward. As the economy grows, so too will the credit demand, requiring banks to expand their balance sheets, and in order to be able to do so, they will have to augment their capital.

In a structurally transforming economy with rapid upward mobility like India, credit demand will expand faster than GDP for several reasons. First, India will shift increasingly from services to manufactures whose credit intensity is higher per unit of GDP. Second, investment in infrastructure needs to be at least double. However, this will place enormous demands on credit. Finally, financial inclusion, which both the Government and the Reserve Bank are driving, will bring millions of low income households into the formal financial system with almost all of them needing credit. This means that higher capital requirements will be imposed on banks as per Basel III at a time when the economy's credit demand is going to expand rapidly. How well this tension can be resolved between the demands of growth and the demands of financial stability is a question that will have to be addressed in India and several other EMEs.

This chapter has gone at some length not to argue that the costs of financial stability outweigh the benefits, but to argue that the cost-benefit calculus will vary from country to country, and will vary for a given country over time. So, the challenge for every country, advanced, emerging and developing, is to tailor its financial stability policies to maximize the benefit cost ratio on a dynamic scale.

In the third leg of the equation – the link between growth and sovereign debt sustainability is studied. Like with the other two legs of the new trilemma, even in the case of sovereign debt, there is an inflexion point beyond which fiscal deficits militate against growth. Government borrowing is not bad *per se*, but excessive borrowing is. There is therefore a need to cap total public debt as a proportion of GDP.

What is equally important in respect of fiscal management is the

quality of public expenditure. If the government borrows and squanders that money away on unproductive current expenditure, both fiscal sustainability and growth would be jeopardized. Governments need to spend on merit goods and public goods, in particular on improving human and social capital and on physical infrastructure.

So, after all this discussion, what is the answer to the question: does the pursuit of the new trilemma militate against growth? No. It does not. But there could be some trade-offs and governments will have to tailor their policies to ensure that the benefit–cost calculus is always maximized.

Question 4: What are the Limits to Unconventional Policy Measures?

As the crisis exploded with brutal intensity and depth, central banks around the world acted with an unusual show of policy force, ferociously cutting policy rates to near zero or even zero. Realizing soon that this was not sufficient to restore calm and confidence to the markets, they had to follow up the conventional measures with a slew of unconventional measures variously described as quantitative and credit easing.

The first wave of unconventional measures was aimed at providing liquidity to the system either by way of collateralized loans through the repo window or outright purchase of bonds. Liquidity management is of course standard monetary policy procedure. What made this unconventional were mainly two things. The first was the quantum of operations. The volumes were large, and were aimed at flooding the market with liquidity, much beyond what is expected in normal times.

The second characteristic that made liquidity infusion unconventional was the relaxation of standards regarding the type of bonds bought under the OMOs. In this regard, different central banks relaxed regulations to different extents. While the Bank of England stuck to treasuries, the Fed bought federally backed mortgage bonds in addition to treasuries. The Bank of Japan went further buying corporate bonds, commercial paper, exchange traded funds and real estate investment trusts.

The second wave of unconventional measures went beyond repo operations and OMOs. The Bank of Japan extended targeted loans to banks to spur long-term investment. The Fed supplemented two rounds of QE with ‘operation twist’ – of purchasing longer term treasuries against the sale of short-term treasuries in an effort to depress the entire yield curve rather than just its short end. It also began publishing the expected interest rate path for the coming years. The ECB, as noted earlier, is providing three-year loans to banks.

What of the central banks of the emerging economies? They too had resorted to unconventional measures although their policy rates did not hit the zero lower bound. The Reserve Bank, for example, at the height of the crisis, operated a term repo window to enable banks to meet the liquidity requirement of mutual funds and non-bank finance companies (NBFCs). The statutory liquidity ratio (SLR) prescription for banks was relaxed by up to 1.5 percentage points of their net demand and time liabilities (NDTL) for this purpose. The risk weight on banks’ exposure to NBFCs, which was raised earlier, was rolled back. The restriction on commercial banks in buying back the certificates of deposit (CDs) held by mutual funds was lifted. A foreign currency swap facility for banks was also instituted.

Unconventional measures have been contentious. Central banks have largely maintained that the unconventional measures they deployed are a part of the monetary policy arsenal, and that the intent behind them is to improve monetary transmission. Their critics have argued that central banks have actually stepped beyond their mandates to accommodate extraneous compulsions.

All in all, the global financial crisis and the ongoing Eurozone crisis have raised important questions about the unconventional measures that central banks can resort to – their range, intent and the way the intent should be communicated to the markets.

Conclusion

This chapter not only explains the rationale for the theme ‘Price Stability, Financial Stability and Sovereign Debt Sustainability: Policy

Challenges from the New Trilemma', but also illustrates how the three legs under the new trilemma interact with one another. Thereafter, it raises the following four questions that central banks need to address in the context of the new trilemma:

- (i) Is there a return of fiscal dominance of monetary policy?
- (ii) Will the management of the new trilemma erode the autonomy and accountability of central banks?
- (iii) Does the pursuit of the new trilemma militate against growth?
- (iv) What are the limits to unconventional policy measures?

To what extent are the old and new trilemmas similar? Under the old trilemma – the impossible trinity – countries had to sacrifice one of the three objectives – fixed exchange rate, independent monetary policy and free capital flows. Under the new trilemma – the holy trinity – no country can afford to sacrifice any of the objectives as the feedback loops can quickly shift the economy from equilibrium to disequilibrium. The issue really is of managing the *inter se* prioritization among the objectives and of determining the role of the central bank in this management.

So, how best can the new trilemma be managed? The crisis has given valuable lessons from practice. There are also assorted bits of theory. The task ahead is to put them together into a coherent, workable theory of the new trilemma. In his best-selling book, 'The Ascent of Money', Niall Ferguson says that sometimes the most important historical events are the non-events: the things that did not happen. From that perspective, that the Great Recession did not turn into the second Great Depression, as feared, will count as a major non-event, notwithstanding the depth and duration of this recession. If the Euro survives the sovereign debt crisis, as hoped, it will be another spectacular non-event. Non-events they may be, but they have changed the thinking on central bank mandates in a powerful way. How influential that thinking will be on the way forward will depend on how firmly central banks embrace the new trilemma.

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Evidence on Interest Rate Channel of Monetary Policy Transmission in India

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Introduction

How monetary policy affects output and inflation is an important question. The monetary policy framework of a central bank aims to attain the desired objectives of policy in terms of inflation and growth. Typically, central banks exercise control over the monetary base and/or short-term interest rates such as the rate at which they supply or absorb reserves to/from the banking system in the economy. How these interest rate actions and liquidity operations of the central banks impact the end-objectives depends on the underlying monetary transmission.

Monetary transmission refers to a process through which changes in the policy get translated into the ultimate objectives of inflation and growth. Traditionally, four key channels of monetary policy transmission have been identified in literature, such as: (i) quantum channel relating to money supply and credit; (ii) interest rate channel; (iii) exchange rate channel; and (iv) asset price channel. In recent years, a fifth channel, *i.e.*, expectations channel, has assumed increased prominence in the conduct of forward-looking monetary policy.

Literature also makes a distinction of monetary transmission through two sets of channels: (i) neoclassical channels; and (ii) non-neoclassical channels. The neoclassical channels focus on how interest rate changes operating through investment, consumption and trade impact the ultimate objectives. The non-neoclassical channels operate

primarily through change in credit supply and impact on the behaviour of banks and their balance sheets. How these channels function in a given economy depends on the stage of development of the economy and the structure of its financial system.

Interestingly, the channels of monetary transmission are often referred to as a black box – implying that it is known that monetary policy does influence output and inflation but it is not known for certain how precisely it does so. This is because not only do different channels of monetary transmission tend to operate at the same time but they also change over time. As Bernanke and Gertler (1995) observed:

To a large extent, empirical analysis of the effects of monetary policy has treated monetary transmission mechanism itself as a 'black box'. As a result, questions remain: does monetary policy affect the real economy? If so, what is the transmission mechanism by which these effects take place? Monetary policy changes affect market interest rates such as bank lending and bank deposit rates in varying degrees over time.

Changes in interest rates by the monetary authorities could also induce movements in asset prices to generate wealth effects in terms of market valuations of financial assets and liabilities. Higher interest rates can induce an appreciation of the domestic currency, which in turn, can influence net exports and, hence, aggregate demand and output. At the same time, policy actions and announcements affect expectations about the future course of the economy and the degree of confidence with which these expectations are held.

On the output side, these changes affect the spending, saving and investment behaviour of individuals and firms in the economy. In a simplistic view, other things being equal, higher interest rates tend to encourage saving rather than spending. Similarly, a higher value of currency in the foreign exchange market encourages spending by making foreign goods less expensive relative to goods produced at home. So changes in the interest rate and exchange rate affect the demand for goods and services produced.

On the inflation front, the level of demand relative to domestic supply capacity, in the labour market and elsewhere, is a key influence on domestic inflationary pressure. If demand for labour exceeds the

supply, there will be upward pressure on wages, which some firms will be able to pass into higher prices charged to consumers. Also, exchange rate movements have a direct effect on the domestic prices of imported goods and services, and an indirect effect on the prices of those goods and services that compete with imports or use imported inputs, and thus on the component of overall inflation.

In general, transmission mechanism is largely conditioned by the monetary policy framework, structure and depth of the financial system in which the central bank operates and the state of real economy. While there is vast empirical literature on monetary policy transmission for advanced economies, only a limited number of empirical studies have examined the monetary transmission mechanisms in emerging and developing economies (EDEs). This is understandable given the underdeveloped nature of financial markets and rapid structural changes in EDEs. However, since the 2000s, analysis of monetary transmission mechanisms in EDEs, including India, has gained prominence due to structural and economic reforms and subsequent transitions to market-oriented policy regimes. Literature on monetary transmission in India is still in a nascent stage, though in recent times, quite a few studies using traditional vector auto-regression (VAR) and structural vector auto-regression (SVAR) approaches have been attempted. However, from a practitioner's standpoint, the impact of the policy interest rate changes of the Reserve Bank of India (RBI) on real economy and inflation still remains an open question.

Against this background, this chapter presents an empirical evidence of interest rate channels of monetary policy transmission in India based on a quarterly SVAR framework. In addition, this chapter explicitly incorporates the role of systemic liquidity in the modelling framework as its level has been found to have strong implications over the transmission of policy signals.

The chapter is organized as follows. In the next section, the literature is reviewed, covering both theory and empirical evidence, in the international context as well as in India. Next, the chapter briefly captures the evolution of monetary policy operating framework in India and then discusses the development of financial markets and

inter-linkages in interest rates across markets. It then goes on to estimate the dynamic responses of output and inflation to monetary policy innovations using a quarterly SVAR model. The last section presents the conclusions.

Literature Review: Theory and Evidence

In the literature, there is a general consensus that monetary policy affects real economy at least in the short run. However, a consensus is yet to emerge on the channel through which monetary policy influences the behaviour of output and prices. The theoretical explanations on monetary policy transmission have evolved over the years, with major episodes of crises playing an important role in revaluations of earlier tenets. Keynes in his general theory of output and employment described the importance of interest rate channel of monetary policy transmission. Monetarist characterization of transmission mechanism by Friedman and Schwartz (1963) emphasized the role of money supply besides other assets. Life cycle hypothesis by Ando and Modigliani (1963) emphasized the wealth effect, while Tobin (1969) highlighted the importance of the cost of capital and portfolio choice in the transmission of monetary policy.

In recent years, monetary policy transmission has been an issue of extensive research, particularly since Bernanke's seminal article in 1986, which provided alternative explanations of real and nominal sources of prices for explaining the money-income relationship. However, the findings on the efficacy of various channels of transmission remain an unresolved issue. Bernanke and Blinder (1988) pointed out the importance of credit channel of monetary policy transmission in the US. However, Romer and Romer (1990) did not find support for credit channel of monetary transmission.

This lack of a consensus on the channels of monetary transmission can be clearly seen from the debate in a symposium on 'The Monetary Policy Transmission' published in the *Journal of Economic Perspectives* in 1995. Taylor (1995), using a financial market prices framework, reviewed the impact of monetary policy transmission on real gross domestic product (GDP) and prices, and found the traditional interest

rate channel to be an important channel. Obstfeld and Rogoff (1995) emphasized the importance of exchange rate channel and concluded that the conduct of monetary policy has international implications. Meltzer (1995) re-emphasized transmission through multiple asset prices, extending beyond interest rates, exchange rate and equity prices.

Bernanke and Gertler (1995) contested the efficacy of interest rate channel. They argued that monetary policy affects short-term interest rates but has little impact on long-term interest rates, which can only have large effects on purchases of durable assets, implying monetary policy ineffectiveness. They argued that the puzzle could be resolved through the credit channel of transmission. Edwards and Mishkin (1995), however, doubted the effectiveness of the bank lending channel arguing that with financial innovations, banks were becoming increasingly less important in credit markets. Given these contrasting views, Mishkin (1995, 1996 and 2001) provided an overview on the working of various channels for better understanding and improvement in the conduct of monetary policy.

Notwithstanding the various theoretical perspectives and the lack of a consensus, several empirical studies have tried to identify the various channels of monetary policy transmission across a number of countries. Using the vector error correction modelling (VECM) approach, Ramey (1993) found that the money channel was much more important than credit channel in explaining the direct transmission of monetary policy shock on the US economy. Recognizing the importance of financial frictions despite developments in macroeconomics, Bean *et al.* (2002) highlighted the inadequacy of interest rate channel in explaining the impact of monetary policy shock on demand.

In the Euro area countries, Smets and Wouters (2002) found that monetary policy shock via the interest rate channel affected real output, consumption and investment demand. Angeloni *et al.* (2003) also found the interest rate channel to be the completely dominant channel of transmission in a few Euro area countries, while being an important channel in almost all of them. Where the interest rate channel was not

dominant, either bank lending channels or other financial transmission channels were present.

Surveying the empirical studies on monetary policy transmission then, Loayza and Schmidt-Hebbel (2002) concluded that traditional interest rate channel was still the most relevant channel in influencing output and prices, while exchange rate channel became important in open economies. Recent survey by Boivin *et al.* (2010) also concluded that the neoclassical channels, *i.e.*, direct interest rate effects on investment spending, wealth and inter-temporal substitution effects on consumption, and the trade effects through the exchange rate, continued to remain the core channels in macro-economic modelling, while there was little evidence on the efficacy of bank-based non-neoclassical channels of transmission.

Empirical results also show that the experience of monetary policy of the US Federal Reserve (Fed) *vis-à-vis* the European Central Bank (ECB) during 2001–07 was different. During this period, the Fed cut interest rates more vigorously than the ECB. By comparison with the Fed, the ECB followed a more measured course of action. Using a dynamic stochastic general equilibrium (DSGE) model with financial frictions, Christiano *et al.* (2008) found that the ECB's policy actions had a greater stabilizing effect than those of the Fed. As a consequence, a potentially severe recession turned out to be only a slowdown, and inflation never departed from levels consistent with the ECB's quantitative definition of price stability. Other factors that account for the different economic outcomes in the Euro area and the US include differences in shocks and the degree of wage and price flexibility.

A number of studies have also examined the efficacy of various channels in EDEs with contrasting results. Using the VAR framework, Disyatat and Vongsinsirikul (2003), in Thailand, found that in addition to the traditional interest rate channel, banks play an important role in the monetary policy transmission mechanism, while exchange rate and asset price channels were relatively less significant. In Sri Lanka, Amarasekara (2008) found interest rate channel to be important for monetary policy transmission. For Philippines, Bayangos (2010) found the credit channel of monetary transmission to be important. In the

case of South Africa, Kabundi and Nonhlanhla (2011), using a factor augmented VAR (FAVAR) framework, concluded that monetary policy shock had a short-lived impact on both the real economy and prices and in addition to interest rate channel, found confidence channel to be important in monetary policy transmission. Ncube and Ndou (2011) showed that monetary policy tightening in South Africa can marginally weaken inflationary pressures through household wealth and the credit channel.

Mohanty and Turner (2008) argued that credible monetary policy frameworks put in place across emerging market economies (EMEs) in recent years have strengthened the interest rate channel of monetary policy transmission. Mukherjee and Bhattacharya (2011) found that the interest rate channel impacts private consumption and investment in EMEs, with and without inflation targeting. Acosta-Ormaechea and Coble (2011), comparing the monetary policy transmission in dollarized and non-dollarized economies, found that the traditional interest rate channel was found to be more important in Chile and New Zealand, while the exchange rate channel played a more substantial role in controlling inflationary pressures in Peru and Uruguay.

Some studies, on the other hand, have argued that monetary policy transmission is weak in the EMEs and low-income countries. Reviewing monetary policy transmission in low-income countries, Mishra *et al.* (2010) found that weak institutional mechanism impaired the efficacy of traditional monetary transmission channels namely, interest rate, bank lending and asset price. Similarly, for a group of EMEs, Bhattacharya *et al.* (2011) argued that the weakness in the domestic financial system and the presence of a large and segmented informal sector led to ineffective monetary policy transmission. Based on the VECM model, they suggested that the most effective mechanism of monetary policy impacting inflation was through the exchange rate channel, while interest rates did not affect aggregate demand.

The recent financial crisis has shown the inadequacy in the monetary transmission mechanism through the traditional channels. Thus, during the post-crisis period, a number of studies have attempted

to capture the additional dimensions of central bank policy that have been at the centre stage for policy transmission. While research prior to the crisis often cast doubts on the strength of the bank lending channel, evidence during crisis showed that bank-specific characteristics, financial innovations and business models can have implications for provision of credit and smooth transmission of monetary policy. Therefore, the recent crisis has clearly highlighted the role of banks as a potential source of frictions in the transmission mechanism of monetary policy.

Cecchetti *et al.* (2009) emphasized that the disentangling effects of the various channels during the crisis period was difficult. They pointed out that the crisis, in fact, has exposed the inadequacy of models which could not examine: (i) the role that financial factors play in the monetary policy transmission process through various channels; and (ii) how financial disturbances can be amplified and spill over to the real economy. Walsh (2009) argued that financial frictions, albeit not a part of consensus model of monetary policy, affect both the monetary policy transmission process and generate distortions in the real economy. For the Euro area, ECB (2010) found that during the recent episode of financial turmoil, non-standard monetary policy measures undertaken to keep the interest rate pass-through channel operational proved to be effective. Trichet (2011) emphasized that even though non-standard measures helped in restoring the monetary policy transmission during crisis they needed to be pursued independently from standard measures.

Taylor and Williams (2010) viewed that though simple interest rate rules have worked well in transmitting the monetary policy, further research was needed for incorporating a wider set of models and economic environments, especially international linkages of monetary policy. Recognizing the large-scale use of unconventional monetary policy measures through quantitative easing during the recent crisis, Curdia and Woodford (2010) extended the basic New Keynesian model of the monetary transmission mechanism to explicitly include the central bank's balance sheet. Highlighting the role of financial intermediaries in monetary policy transmission, Bean *et al.* (2010) have

emphasized that the role of monetary policy in the run up to crisis was less through conventional monetary policy channels but more through the 'risk taking channel'.

Bernanke (2011) and Yellen (2011) argued that the transmission channels through which unconventional and conventional monetary policy affect economic conditions are quite similar. However, Yellen (2011) highlighted the importance of 'portfolio balance channel' and 'expectations' channel during crisis. Analysing the impact of quantitative easing adopted during recent global financial crisis on the UK economy, Joyce *et al.* (2011) have highlighted the importance of the different transmission channels, particularly asset prices which were expected to have conventional effects on output and inflation.

In short, crisis has highlighted two important aspects of monetary policy transmission. First, due to information asymmetries and other inefficiencies across financial markets, the conventional channels of monetary policy transmission may not always work effectively. In this context, a number of studies have underscored the importance of stability of financial intermediaries in order to facilitate a smooth transmission of policy. Second, when the traditional interest rate channel of the monetary policy transmission mechanism broke down after policy rates reached the zero lower bound during crisis, the role of unconventional policy measures, which worked mainly through asset price and expectations channels, became more prominent.

A number of studies have also examined the importance of different channels of monetary policy transmission in India. Al-Mashat (2003) using a structural VECM model for the period 1980:Q1 to 2002:Q4 (Q1 and Q4 refers to first and fourth quarter, respectively) found interest rate and exchange rate channels to be important in the transmission of monetary policy shocks on key macroeconomic variables. Bank lending was not an important channel due to the presence of directed lending under the priority sector. On the other hand, Aleem (2010) studying credit, asset price and exchange rate channels of monetary policy transmission using VAR models for the period 1996:Q4 to 2007:Q4 found the credit channel to be the only important channel of monetary transmission in India.

RBI (2005), using a VAR framework for the period 1994–95 to 2003–04, found that monetary tightening through a positive shock to the bank rate had the expected negative effect on output and prices with the peak effect occurring after around six months. Monetary easing through a positive shock to broad money had a positive effect on output and prices with peak effect occurring after about two years and one year, respectively. Further, exchange rate depreciation led to increase in prices with the peak effect after six months and a positive impact on output. The RBI Working Group on Money Supply (Chairman: Y.V. Reddy, 1998) pointed to some evidence of interest rate channel of monetary transmission.

Using a cointegrated VAR approach, Singh and Kalirajan (2007) showed the significance of interest rate as a major policy variable for conducting monetary policy in the post-liberalized Indian economy, with cash reserve ratio (CRR) playing a complementary role. Patra and Kapur (2010) also found that aggregate demand responds to interest rate changes with a lag of at least three quarters. However, they pointed out that the presence of institutional impediments in the credit market such as administered interest rates could lead to persistence of the impact of monetary policy up to two years. Bhaumik *et al.* (2010) highlighted the importance of bank ownership in monetary policy transmission through the credit channel. Pandit and Vashisht (2011) found that policy rate channel of transmission mechanism, a hybrid of the traditional interest rate channel and credit channel, works in India, as in other six EMEs considered by them.

Evolution of Monetary Policy Operating Framework in India

The overnight rate emerged as the most commonly pursued operating target in the conduct of monetary policy in the US, the UK, Japan, Canada and Australia. In India, as in most countries, monetary policy framework has evolved in response to and in consequence of financial developments, openness and shifts in the underlying transmission mechanism. The evolution of monetary policy framework in India can be seen in phases.

The Reserve Bank of India was established in 1935. Since the formative years during 1935–50, the focus of monetary policy was to regulate the supply of and demand for credit in the economy through the bank rate, reserve requirements and open market operations (OMO). During the development phase during 1951–70, monetary policy was geared towards supporting plan financing, which led to introduction of several quantitative control measures to contain the consequent inflationary pressures. While ensuring credit to preferred sectors, the Bank Rate was often used as a monetary policy instrument. During 1971–90, the focus of monetary policy was on credit planning. Both the statutory liquidity ratio (SLR) and the cash reserve ratio (CRR) prescribed for banks were used to balance government financing and inflationary pressure.

The 1980s saw the formal adoption of monetary targeting framework based on the recommendations of the Chakravarty Committee (1985). Under this framework, reserve money was used as operating target and broad money (M_3) as an intermediate target. Subsequently, structural reforms and financial liberalization in the 1990s led to a shift in the financing paradigm for the government and commercial sectors with increasingly market-determined interest rates and exchange rate.

By the second half of the 1990s, in its liquidity management operations, the RBI was able to move away from direct instruments to indirect market-based instruments. Beginning in April 1999, the RBI introduced a full-fledged liquidity adjustment facility (LAF) and it was operated through overnight fixed rate repo and reverse repo from November 2004. This helped develop interest rate as an important instrument of monetary transmission. However, this framework witnessed certain limitations due to the lack of a single policy rate and the absence of a firm corridor. Against this background, RBI introduced a new operating procedure in May 2011, where the weighted average overnight call money rate was explicitly recognized as the operating target of monetary policy and the repo rate was made the only one independently varying policy rate (RBI, 2011).

The new operating framework with the modified LAF underlines the dominance of the interest rate channel of monetary transmission.

This means that once the RBI changes the policy repo rate, it should immediately impact the overnight interest rate which is the operational rate and then transmit through the term structure of interest rates as well as bank lending rates. Dominance of this channel was also evident from the policy actions of RBI. Over the years, in comparison with other monetary policy instruments, the use of interest rate instruments (Repo and Reverse Repo) by RBI has been more frequent (Table 2.1). Except for the year 2008–09, when CRR and repo rate were reduced 10 times and 8 times, respectively, in the wake of global financial crisis, RBI has shown increased preference of using interest rate as a primary tool of monetary policy. A snapshot of RBI's policy stance and its policy changes since 2001 is given in Appendix 2.1.

Table 2.1: Frequency of Changes in Monetary Instrument in India (2001–02 to 2011–12)

| Year/ No. of times | CRR | Bank rate | Repo | Reverse repo |
|-----------------------|-----|-----------|------|-----------------|
| 2001–02 | 4 | 2 | 4 | 3 |
| 2002–03 | 2 | 1 | 3 | 3 |
| 2003–04 | 1 | 1 | 1 | 1 |
| 2004–05 | 2 | 0 | 0 | 0 |
| 2005–06 | 0 | 0 | 2 | 3 |
| 2006–07 | 4 | 0 | 5 | 2 |
| 2007–08 | 4 | 0 | 0 | 0 |
| 2008–09 | 10 | 0 | 8 | 3 |
| 2009–10 | 2 | 0 | 2 | 2 |
| 2010–11 | 1 | 0 | 7 | 7 |
| 2011–12 | 0 | 0 | 5 | 5 |

Source: Compilation from the data published in the Handbook of Statistics on the Indian Economy.

Development of Financial Markets and Interest Rate Inter-linkages across Markets

An effective implementation of monetary policy needs an assessment of how the monetary policy changes propagate through the financial

markets and the broader economy. In general, monetary policy gets transmitted to final objectives of inflation and growth through two stages. In the first stage, policy changes transmit through the financial system by altering financial prices and quantities. In the second stage, financial prices and quantities influence the real economy by altering aggregate spending decisions of households and firms, and hence the aggregate demand and inflation. Nonetheless, whether monetary policy actions influence the spectrum of market interest rates *inter alia* depend upon the level of development of various segments of financial markets. Cross-country studies suggest that as domestic financial markets grow, transmission of monetary policy through financial channels improves. Therefore, before going for empirical investigation onto the impact of monetary policy on various segments of financial markets, it is important to briefly review the policy measures which have been taken during the post-reform period to deepen interest rate inter-linkages.

Various measures were taken to facilitate the process of price discovery in various segments of financial markets which *inter alia* included deregulation of interest rates; auction-based market borrowing programme of the government; the development of short-term money markets through introduction of money market instruments, such as commercial paper (CP), Treasury Bills and certificates of deposit (CDs); discontinuation of automatic monetization by phasing out of *ad hoc* Treasury Bills; replacing cash credit with term loans and reduction in statutory reserve requirements. These reforms facilitated a shift in the operating framework for monetary management from direct instruments to interest rate-based indirect instruments. Even though the financial reforms began in early 1990s, the impact was seen from the late 1990s.

Money Market

The development in the money market assumes prime importance as it is a key link in the transmission mechanism of monetary policy to financial markets and finally, to the real economy. The call money market was developed into primarily an inter-bank market, while encouraging

other market participants to migrate towards collateralized segments of the market, thereby increasing the overall market integrity.

In order to facilitate the phasing out of corporates and the non-banks from the call money market, new instruments, for example, market repos and collateralized borrowing and lending obligations (CBLO) were created to provide them avenues for managing their short-term liquidity. Non-bank entities completely exited the call money market in August 2005. Maturities of other existing instruments such as CP and CDs were also gradually shortened.

Debt Market

Another segment of financial markets which plays a crucial role in the monetary policy transmission mechanism is the debt market, in particular the government securities market as it is the predominant segment of the overall debt market in India. Banks still statutorily hold 24 per cent of their net demand and time liabilities (NDTL) in government securities.

One of the key policy developments that enabled a more independent monetary policy environment as well as the development of government securities market was the discontinuation of automatic monetization of the government's fiscal deficit since April 1997. This reinforced the auction-based system in the government securities market which was introduced in 1992. The Primary Dealer (PD) system was also revamped to ensure a more dynamic and active participation of PDs in view of the provisions of the Fiscal Responsibility and Budget Management (FRBM) Act, 2003, whereby RBI was prohibited from participating in the primary market effective from April 2006. As a result, a shift towards market-based financing of the government borrowings and an active secondary market for government securities led to expansion of the eligible set of collaterals which enabled RBI to more effectively conduct monetary policy through indirect instruments. While the government securities market in India is considered to be well developed now, the corporate debt market remains comparatively less developed with implications for monetary transmission.

Credit Market

Prior to the 1990s, credit market in India was tightly regulated through credit controls, directed lending and administered interest rates. However, with financial reforms pursued since the early 1990s, not only the banks were provided flexibility to price their products based on their risk assessment, but also restrictions on lending for project finance activity and for personal loans were gradually withdrawn. Furthermore, international best practices were progressively adopted in respect to regulatory norms on capital adequacy, income recognition, asset classification and provisioning. The problem arising out of segmentation of the credit market was addressed with banks providing long-term loans, apart from the traditional short-term funds for working capital. The linkage between the credit market and the equity market has also grown on account of participation by banks in the equity market for raising capital.

Foreign Exchange Market

There was a phased transition from a pegged exchange rate regime to an increasingly market determined exchange rate regime in 1993 and the subsequent adoption of current account convertibility in 1994 and significant liberalization of capital account transactions. The increasing freedom given to corporates and banks to borrow abroad and use derivative products enhanced the linkage of Indian foreign exchange market with the global financial system.

Asset Market

Stock prices are among the most closely watched asset prices in the economy. Equity market in India has witnessed a series of reforms which were aimed at boosting competitive conditions through improved price discovery mechanism; putting in place an appropriate regulatory framework; reducing the transaction costs; and reducing information asymmetry, thereby boosting the investor confidence.

Integration across Financial Markets

As price discovery improves and the range of instruments expands, economic agents tend to hold more interest rate sensitive instruments

in their balance sheets. Similarly, increasing monetization and progress towards financial inclusion have also expanded the formal financial system in the economy and this ought to enhance the scope of monetary transmission.

Given the various policy measures initiated during post-reform period to development various segments of financial market, it is expected that interest rate structure shares an equilibrium relationship across markets. To test this proposition, Granger's causality across markets based on a VAR framework using monthly data from April, 2001 to March, 2011 was first examined. Two blocks were considered, namely, (i) policy variable – proxied by monthly average call money rate (CMR); and (ii) other financial market variables. The latter includes yield on government securities with residual maturity of ten years (GoI_10Y) and yield on the five-year 'AAA'-rated corporate bonds (AAA_5Y) representing debt market, weighted average lending rate (WALR) indicating credit market,² BSE sensex (Sensex) showing equity market and rupee per USD (RSUSD) representing foreign exchange market. The test was repeated by replacing AAA_5Y by the yield of the ten-year 'AAA' rated corporate bonds (AAA_10Y) and results are presented in Table 2.2.

Table 2.2: Block Exogeneity Test (Multi-variate)

| Dependent variables | Exogenous variables | Test Statistic- Chi Square (p-value) | Remark |
|---------------------------------------|---------------------------------------|--------------------------------------|----------------|
| CMR | GoI_10Y, WALR, AAA_5Y, Sensex, RSUSD | 11.31 (0.04) | Bi-directional |
| GoI_10Y, WALR, AAA_5Y, Sensex, RSUSD | CMR | 19.26 (0.00) | |
| CMR | GoI_10Y, WALR, AAA_10Y, Sensex, RSUSD | 9.34 (0.10) | Bi-directional |
| GoI_10Y, WALR, AAA_10Y, Sensex, RSUSD | CMR | 16.02 (0.01) | |

Results of the block exogeneity test show that there exists bi-directional causality between call money market and other segments of

the financial markets. In order to examine the equilibrium relationship across markets, a co-integration test is conducted using the same data among the four variables. The Augmented Dickey–Fuller (ADF) and Zivot-Andrews test was applied to test for the order of integration. Barring Call Money Rate (CMR), all variables were found to be non-stationary in level form and stationary in differenced form (Table 2.3).

Table 2.3: Results of the Unit Root Test

| Variables | ADF test | | Zivot-Andrews test [@] | |
|-----------|----------|------------------|---------------------------------|--------------------|
| | Level | First difference | Level | First difference |
| CMR | -3.92** | - | -4.42 (Apr 2009) | -9.28* (Nov 2008) |
| WALR | -2.64 | -10.07* | -4.98 (Apr 2009) | -7.63* (Nov 2008) |
| AAA_5Y | -2.17 | -3.60** | -5.01 (Oct 2008) | -5.95* (Dec 2008) |
| AAA_10Y | -1.49 | -3.28*** | -4.31 (Oct 2008) | -6.72* (July 2008) |
| GOI_10Y | -2.67 | -11.35* | -4.11 (Oct 2008) | -6.44* (Oct 2008) |
| SENSEX | -2.59 | -4.56* | -4.83 (June 2008) | -5.25** (Apr 2009) |
| RSUSD | -2.12 | -8.24* | -4.82 (Sept 2008) | -5.55** (May 2008) |

*Note: @Zivot-Andrews test for break in both intercept and slope has been used. Months shown in brackets indicate point of structural breaks. *, ** and *** indicates statistical significance at 1per cent, 5per cent and 10per cent level, respectively*

Table 2.4: Johansen's Co-integration Test

| No. of co-integration vector | Eigenvalues | Trace statistic | p-values |
|------------------------------|-------------|-----------------|----------|
| 0 | 0.536 | 184.52 | 0.000 |
| 1 | 0.335 | 101.52 | 0.000 |
| 2 | 0.285 | 57.42 | 0.004 |
| 3 | 0.110 | 21.19 | 0.357 |
| 4 | 0.072 | 8.54 | 0.417 |
| 5 | 0.005 | 0.51 | 0.474 |

Johansen's co-integration test suggests the existence of long-run relationships between the variables at 1 per cent level of significance (Table 2.4). This suggests that innovations in monetary policy get transmitted to the array of interest rates and other key asset market rates.

Response of Output and Inflation to Monetary Policy Innovations: A SVAR Model

Sim's Vector Autoregression (VAR) methodology has been extensively used in examining the efficacy of monetary policy transmissions across several countries. This approach provides a major advantage of taking into account the simultaneity between monetary policy instruments and relevant macroeconomic variables. However, there are several versions of VAR models to examine monetary policy transmission such as the traditional VAR, SVAR and Factor Augmented VAR (FAVAR). SVAR models, unlike in the traditional VAR models, provide explicit behavioural interpretations for all the parameters. Following Bernanke and Blinder (1992), a standard SVAR approach is used to examine how monetary policy shocks affect the real economy.

SVAR is a multi-variate, linear representation of a vector of observables on its own lags and (possibly) other variables as a trend or a constant. The interpretations of SVAR models require additional identifying assumptions that must be motivated based on institutional knowledge, economic theory or other extraneous constraints on the model responses. Only after decomposing forecast errors into structural shocks that are mutually uncorrelated and have an economic interpretation, one assesses the causal effects of these shocks on the model variables.

Consider a K -dimensional time series, $y_t, t = 1, 2, \dots, T$. Let, y_t can be approximated by a vector autoregression of finite order ' p '. The objective is to learn about the parameters of the SVAR model.

$$B_0 y_t = B_1 y_{t-1} + \dots + B_p y_{t-p} + \varepsilon_t \quad (\text{Equation. 2.1})$$

where, ε_t denotes a mean zero serially uncorrelated error term, also referred as structural innovation or structural shock. The error term is assumed to be unconditionally homoskedastic, unless noted otherwise. The model can be written more compactly as:

$$B(L) y_t = \varepsilon_t \quad (\text{Equation. 2.2})$$

where, $B(L) = B_0 - B_1 L - B_2 L^2 - \dots - B_p L^p$ is the autoregressive lag order polynomial. The variance-covariance matrix of the structural error

term is typically normalized such that:

$$E(\varepsilon_t \varepsilon_t') \equiv \Sigma_\varepsilon = I_K. \quad (\text{Equation. 2.3})$$

This means, first, that there are as many structural shocks as variables in the model. Second, structural shocks by definition are mutually uncorrelated, which implies that Σ_ε is diagonal. Third, the variances of all structural shocks are normalized to unity.

In order to allow estimation of the structural model one requires to derive its reduced-form representation. This involves expressing y_t as a function of lagged y_t only. For deriving the reduced form representation, both sides of the SVAR representation is multiplied by $B_0^{(-1)}$:

$$B_0^{-1} B_0 y_t = B_0^{-1} B_1 y_{t-1} + \dots + B_0^{-1} B_p y_{t-p} + B_0^{-1} \varepsilon_t \quad (\text{Equation. 2.4})$$

Thus, the model can be represented as:

$$y_t = A_1 y_{t-1} + \dots + A_p y_{t-p} + e_t \quad (\text{Equation. 2.5})$$

with, $A_i = B_0^{-1} B_i, i = 1, 2, \dots, p$ and $e_t = B_0^{-1} \varepsilon_t$. Equivalently the model can be written more compactly as:

$$A(L) y_t = e_t, \quad (\text{Equation. 2.6})$$

with, $A(L) = A_0 - A_1 L - A_2 L^2 - \dots - A_p L^p$ denotes the autoregressive lag order polynomial. Standard estimation methods allow one to obtain consistent estimates of the reduced-form parameters $A_i, i = 1, 2, \dots, p$, the reduced-form errors e_t and their covariance matrix $E(e_t e_t') \equiv \Sigma_\varepsilon$.

Thus, the reduced-form innovations e_t are, in general, a weighted average of the structural shocks ε_t . As a result, studying the response of the vector y_t to reduced-form shocks e_t will not tell anything about the response of y_t to the structural shocks ε_t . It is the latter's responses that are of interest, if one wants to learn about the structure of the economy. These structural responses depend on $B_i, i = 0, 1, 2, \dots, p$.

By construction, $e_t = B_0^{-1} \varepsilon_t$ and hence, $\Sigma_\varepsilon = B_0^{(-1)} B_0^{(-1)}$, given that $\Sigma_\varepsilon = I_K$. Identification can be achieved by imposing identifying restrictions on B_0^{-1} in $e_t = B_0^{-1} \varepsilon_t$. By construction a unit innovation in the structural shocks in this representation is an innovation of size one

standard deviation, so structural impulse responses based on B_0^{-1} are responses to one-standard deviation shocks.

Equivalently, one could have left the diagonal elements of Σ_ε unconstrained and set the diagonal elements of B_0 to unity in $e_t = B_0^{-1}\varepsilon_t$. A useful result in this context is that, B_0 being lower-triangular implies that B_0^{-1} is lower-triangular as well.

The vector y_t is split into two components, viz. $[Z_t', R_t']'$, where, R_t represents the instrument of monetary policy, and Z_t is a vector containing all other (non-policy) endogenous variables. Accordingly, the matrices B_i are decomposed as follows:

$$B_i = \begin{bmatrix} B_i^{ZZ} & B_i^{ZR} \\ B_i^{RZ} & B_i^{RR} \end{bmatrix}, \text{ for } i = 0, 1, 2, \dots, k. \quad (\text{Equation. 2.7})$$

Noting that the scalar $B_0^{RR} = 1$, it follows that,

$$Z_t = (B_0^{ZZ})^{-1} \left[b^Z + \sum_{i=1}^k B_i^{ZZ} Z_{t-i} - B_0^{ZR} R_t + \sum_{i=1}^k B_i^{ZR} R_{t-i} + \varepsilon_t^Z \right] \quad (\text{Equation. 2.8})$$

$$R_t = b^R - B_0^{RZ} Z_t + \sum_{i=1}^k B_i^{RZ} Z_{t-i} + \sum_{i=1}^k B_i^{RR} R_{t-i} + \varepsilon_t^R \quad (\text{Equation. 2.9})$$

where, ε_t^Z is a vector of orthogonal disturbances and ε_t^R is a disturbance that is assumed to be orthogonal to ε_t^Z . The first equation describes the evolution of the non-policy variables of the model in response to changes in all contemporary and past endogenous variables as well as shocks that cannot be forecast. The second equation characterizes the behaviour of the monetary policy instrument in response to other endogenous variables, lagged values of the policy variable and shocks that cannot be forecast.

The identifying assumption is that the policy variable, R_t affects non-policy variables only with a lag of one period (assumed here to be one quarter). Formally, it is assumed that, $B_0^{ZR} = 0$. The policy variable, however, is allowed to respond to all contemporaneous variables. As Z_t and ε_t^R are uncorrelated in this case, estimates of the coefficients appearing in equations (2.1) and (2.2) are obtained by applying ordinary least square (OLS) on each equation of that system separately. An estimate of $var(\varepsilon_t^R)$ is given

further by the sample variance of the residuals of equation (2.1).

Let, $G = B_0^{-1}$, so that $e_t = G\varepsilon_t$. Consider the vector y_t contains four variables, namely, y_1, y_2, y_3 and y_4 . The nature of the system is such that the pure innovations are serially uncorrelated and orthogonal to each other. The G matrix is defined as,

$$G = \begin{pmatrix} 1 & 0 & 0 & 0 \\ g_{21} & 1 & 0 & 0 \\ g_{31} & g_{32} & 1 & 0 \\ g_{41} & g_{42} & g_{43} & 1 \end{pmatrix} \quad (\text{Equation. 2.10})$$

Under this framework, it is assumed that y_1 shocks are most exogenous and are not contemporaneously affected by the other variables considered in the model. Accordingly, all the coefficients of the remaining variables in the first row of the matrix G are kept as zero. y_2 is assumed to have been impacted by y_1 shocks contemporaneously but not by other shocks. y_3 is assumed to have been impacted contemporaneously by both y_1 and y_2 shocks. Finally, y_4 is assumed to have been contemporaneously affected by y_1 shocks, y_2 shocks and y_3 shocks.

Empirical Analysis

As examined in the earlier section and corroborated in a number of earlier studies, there is strong evidence of transmission of policy rate changes through the term structure of interest rates, though the strength of transmission varies across markets.³ However, the impact of changes in policy rate on output and inflation and periodicity of lags are open questions. The empirical exercise seeks to address these questions in a parsimonious SVAR model of four variables y_1, y_2, y_3 and y_4 as output, inflation, policy interest rate and money (or credit). This structure explicitly assumes that the real output shocks are mostly exogenous and are not contemporaneously affected by the other variables considered in the model. Price is assumed to have been impacted by the real output shocks contemporaneously but not by other shocks. The policy rate is assumed to have been impacted contemporaneously by both output and price shocks. Finally, the

money supply (or credit) is assumed to have been contemporaneously affected by the real output shocks, price shocks and monetary policy shocks.

In order to test the robustness of the model and to examine the variability of impact of monetary policy action on other variables, alternative measures of the variables were taken. Monetary policy rate is proxied by weighted average overnight call money rate as this is the operating target of the RBI.⁴ As a variant to GDP non-agricultural GDP (NAGDP) was also selected. As price index, three different price indicators, namely, the headline wholesale price index (WPI), non-food manufactured products index (NFMPI) and GDP-deflator were chosen.⁵ As quantity variable, three different variables, namely, non-food credit, narrow money (M_1) and broad money (M_3) were included in the model, alternatively with one at a time. In order to examine the effect of liquidity on monetary policy transmission, market liquidity (as per cent to net demand and time liabilities) was also used as a quantity variable in place of non-food credit or M_1/M_3 . In general, quantity variables such as M_1 , M_3 , credit and liquidity were used in real terms. Alternative specifications were also estimated using these quantity variables in nominal terms.

In general, estimation of any VAR model requires long time series data. In the Indian context, quarterly GDP data are available only from 1996–97:Q1. Accordingly, the models were estimated using quarterly data from 1996–97:Q1 to 2010–11:Q4. Except for policy interest rate variable, all other variables are seasonally adjusted using X-12 ARIMA and entered into the model in log-first differenced form. Depending on the choice of reference variables, 24 models were estimated. This chapter primarily seeks to determine the impact of policy rate changes on output and inflation variability, impulse response functions for each model were analysed. These are reported in Appendix 2.2. From the impulse response functions, the following key inferences can be drawn.

Monetary Policy Effect on Output

The impulse response functions imply that increase in policy interest rate

is associated with a fall in real GDP growth rate. The maximum decline in GDP growth occurs with a lag of two quarter with the overall impact continuing through six to eight quarters ahead. The impulse response is broadly similar to the alternative models with variants of output, inflation, money, and credit.

Monetary Policy Impact on Inflation

The impulse response functions imply that increase in policy interest rate has a negative impact on inflation rate across the alternative measures of inflation. The maximum decline in inflation was observed with a lag of three quarters with the overall impact continuing through eight to ten quarters.

Monetary Policy Impact on Output and Inflation under Varying Market Liquidity Condition

Under this specification, output was taken as NAGDP with quantity variable as market liquidity. Impulse response functions suggest that output falls sharply than prices with similar lags as in the earlier models. Though output was found to have fallen sharply in the very short period, impact on hike in the policy rate on inflation was found to be more than output as the horizon increases. Further, a shock in policy rate leads to decline in market liquidity one quarter ahead. Impact on liquidity is similar irrespective of the choice of price variable. Interestingly, the impact of changes in the policy rate to output and price level is found to be much lower in the SVAR framework without considering the market liquidity variable.

Causality Analysis

In order to assess causality between financial variables, including the policy rate and macroeconomic variables of growth and inflation, block exogeneity tests were conducted. First, the model was divided into two blocks. One block included the macro-variables (output and inflation), while the other block covered the financial variables such as the policy interest rate, monetary aggregates and credit. Generally, bi-directional causality was found between the two sets of blocks (Appendix 2.3). This

suggests that while monetary policy responds to changes in output and inflation, they, in turn, influence monetary variables.

Second, with a view to examining how changes in policy rate affect other set of variables, an alternative block exogeneity test was performed with the first block as policy rate (call money rate) and the second block consisting of other variables, *i.e.*, output, inflation and a quantity variable such as money or credit. In this case, empirical results suggest a uni-directional causality running from changes in policy rate to other set of variables (Appendix 2.4). The results were similar when money and credit were used in real terms except for broad money (M_3).

Conclusion

With the development of financial markets and gradual deregulation of interest rates, monetary policy operating procedure in India has evolved to place greater reliance on interest rates to signal the stance of monetary policy in the recent years. There is significant evidence that policy rate changes transmit through the term structure of interest rates though the intensity of transmission varies across financial markets. But how policy rate changes affect output and inflation remains an open question. Following a quarterly SVAR model, it can be seen that policy rate increases have a negative effect on output growth with a lag of two quarters and a moderating impact on inflation with a lag of three quarters. The overall impact persists through eight to ten quarters. These results are found to be robust across alternative specifications with different measures of output, inflation and liquidity. Significant uni-directional causality was found from policy interest rate to output, inflation and various measures of liquidity except for broad money (M_3).

Appendix 2.1

Table 2.1.1: Monetary Policy Actions in India: 2001 to 2011

| Date | CRR | Bank rate | SLR | Repo rate | Reverse repo rate | Monetary policy stance |
|-----------------|------|-----------|------|-----------|-------------------|--|
| 27 April 01 | 8.00 | 7.00 | 25.0 | 9.00 | 6.75 | Provision of adequate liquidity, vigil on price level and greater flexibility to the interest rate regime in the medium term |
| 30 April 01 | | | | 8.75 | | |
| 19 May 01 | 7.50 | | | | | |
| 28 May 01 | | | | | 6.50 | |
| 7 June 01 | | | | 8.50 | | |
| 23 October 01 | | 6.50 | | | | |
| 3 November 01 | 5.75 | | | | | |
| 29 December 01 | 5.50 | | | | | |
| 5 March 02 | | | | | 6.00 | |
| 28 March 02 | | | | 8.00 | | |
| 1 June 02 | 5.00 | | | | | |
| 27 June 02 | | | | | 5.75 | |
| 30 October 02 | | 6.25 | | | 5.50 | Provision of adequate liquidity, support revival of investment demand, vigil on price level and continue the soft interest rate regime |
| 16 November 02 | 4.75 | | | | | |
| 12 November 02 | | | | 7.50 | | |
| 3 March 03 | | | | | 5.00 | |
| 7 March 03 | | | | 7.10 | | |
| 19 March 03 | | | | 7.00 | | |
| 30 April 03 | | 6.00 | | | 4.50 | |
| 25 August 03 | 4.50 | | | | | |
| 31 March 04 | | | | 6.00 | | Price stability and maintaining monetary and interest rate environment conducive to growth and financial stability |
| 18 September 04 | 4.75 | | | | | |
| 2 October 04 | 5.00 | | | | | |
| 27 October 04 | | | | | 4.75 | |
| 29 April 05 | | | | | 5.00 | |
| 26 October 05 | | | | 6.25 | 5.25 | |
| 24 January 06 | | | | 6.50 | 5.50 | |
| 8 June 06 | | | | 6.75 | 5.75 | |
| 25 July 06 | | | | 7.00 | 6.00 | |
| 31 October 06 | | | | 7.25 | | |
| 23 December 06 | 5.25 | | | | | |
| 6 January 07 | 5.50 | | | | | |

| Date | CRR | Bank rate | SLR | Repo rate | Reverse repo rate | Monetary policy stance |
|----------------|------|-----------|------|-----------|-------------------|--|
| 31 January 07 | | | | 7.50 | | Price stability, anchoring inflation expectations, maintaining growth momentum and financial stability |
| 17 February 07 | 5.75 | | | | | |
| 3 March 07 | 6.00 | | | | | |
| 31 March 07 | | | | 7.75 | | |
| 14 April 07 | 6.25 | | | | | |
| 28 April 07 | 6.50 | | | | | |
| 4 August 07 | 7.00 | | | | | |
| 10 November 07 | 7.50 | | | | | |
| 26 April 08 | 7.75 | | | | | |
| 10 May 08 | 8.00 | | | | | |
| 24 May 08 | 8.25 | | | | | |
| 5 May 08 | 8.50 | | | | | |
| 12 June 08 | | | | 8.00 | | |
| 25 June 08 | | | | 8.50 | | |
| 19 July 08 | 8.75 | | | | | |
| 30 July 08 | | | | 9.00 | | |
| 30 August 08 | 9.00 | | | | | |
| 11 October 08 | 6.50 | | | | | |
| 20 October 08 | | | | 8.00 | | Price stability, anchoring inflation expectations, financial stability and financial inclusion |
| 25 October 08 | 6.00 | | | | | |
| 3 November 08 | | | | 7.50 | | |
| 8 November 08 | 5.50 | | 24.0 | | | |
| 8 December 08 | | | | 6.50 | 5.00 | |
| 5 January 09 | | | | 5.50 | 4.00 | |
| 17 January 09 | 5.00 | | | | | |
| 5 March 09 | | | | 5.00 | 3.50 | |

| Date | CRR | Bank rate | SLR | Repo rate | Reverse repo rate | Monetary policy stance |
|-----------------|------|-----------|------|-----------|-------------------|---|
| 21 April 09 | | | | 4.75 | 3.25 | Contain inflation, anchor inflation expectations and maintain an interest rate regime consistent with price, output and financial stability |
| 7 November 09 | | | 25.0 | | | |
| 13 February 10 | 5.50 | | | | | |
| 27 February 10 | 5.75 | | | | | |
| 19 March 10 | | | | 5.00 | 3.50 | |
| 20 April 10 | | | | 5.25 | 3.75 | |
| 24 April 10 | 6.00 | | | | | |
| 2 July 10 | | | | 5.50 | 4.00 | |
| 27 July 10 | | | | 5.75 | 4.50 | |
| 16 September 10 | | | | 6.00 | 5.00 | |
| 2 November 10 | | | | 6.25 | 5.25 | |
| 16 December 10 | | | 24.0 | | | |
| 25 January 11 | | | | 6.50 | 5.50 | |
| 17 March 11 | | | | 6.75 | 5.75 | |
| 3 May 11 | | | | 7.25 | 6.25 | |
| 16 June 11 | | | | 7.50 | 6.50 | |
| 26 July 11 | | | | 8.00 | 7.00 | |
| 16 September 11 | | | | 8.25 | 7.25 | |
| 25 October 11 | | | | 8.50 | 7.50 | |

Source: Report of the Working Group on Operating Procedure of Monetary Policy, RBI, March 2011.

Appendix 2.2

Model 2.2.1: GDP, WPI-All Commodities, Call Money, Real NFC

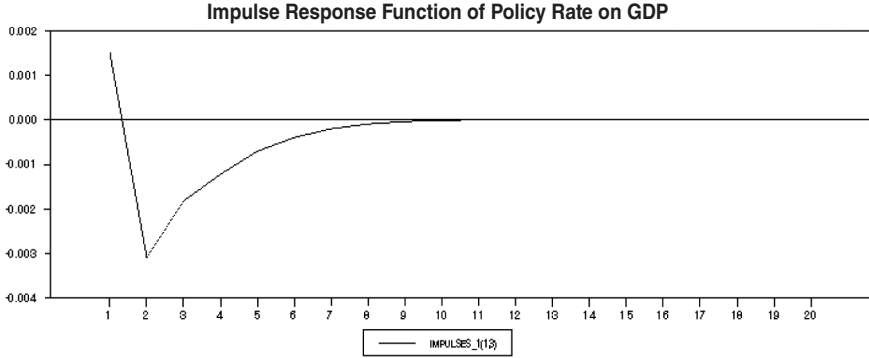


Figure 2.2.1(a) Impulse Response Function of Policy Rate on GDP

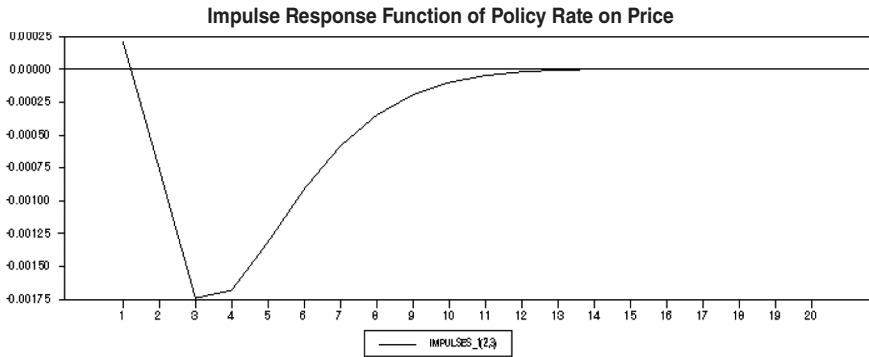


Figure Chart 2.2.1(b) Impulse Response Function of Policy Rate on Price (WPI-All Commodities)

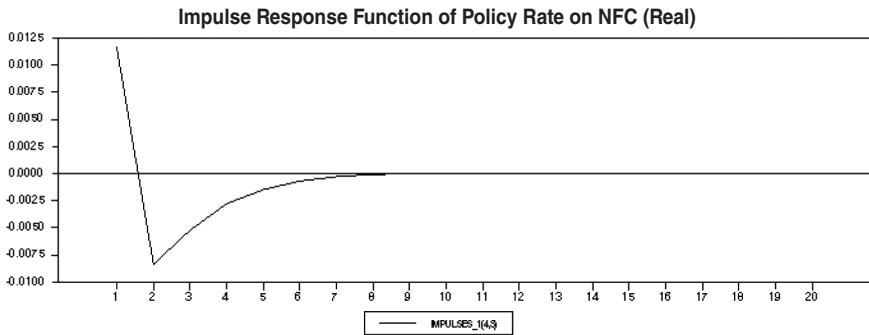


Figure 2.2.1(c) Impulse Response Function of Policy Rate on Real Non-Food Credit

Model 2.2.2: GDP, WPI-NFMP, Call Money, Real NFC

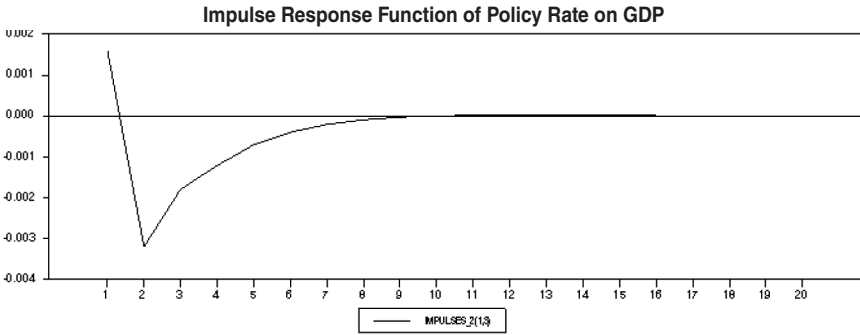


Figure 2.2.2(a) Impulse Response Function of Policy Rate on GDP

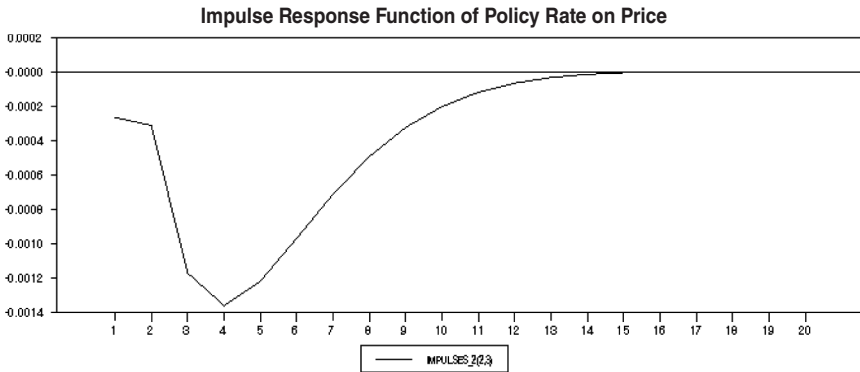


Figure 2.2.2(b) Impulse Response Function of Policy Rate on Price (WPI-NFMP)

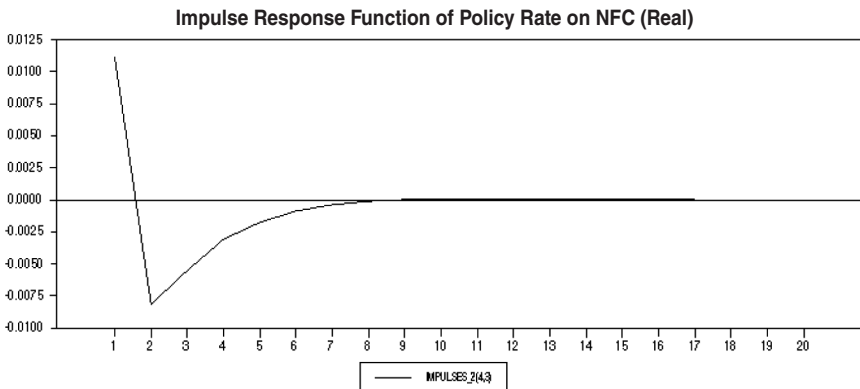


Figure 2.2.2(c) Impulse Response Function of Policy Rate on Real Non-Food Credit

Model 2.2.3: GDP, GDP Deflator, Call Money, Real NFC

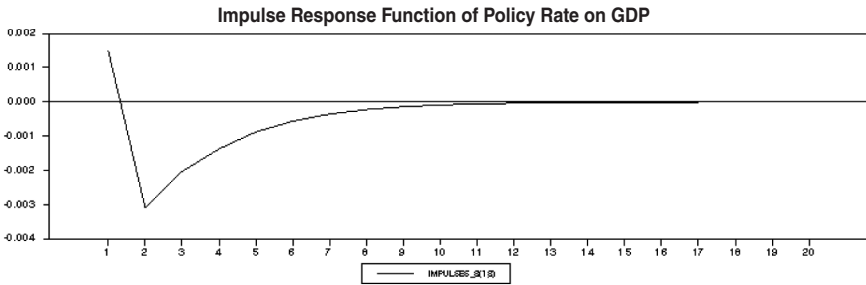


Figure 2.2.3(a) Impulse Response Function of Policy Rate on GDP

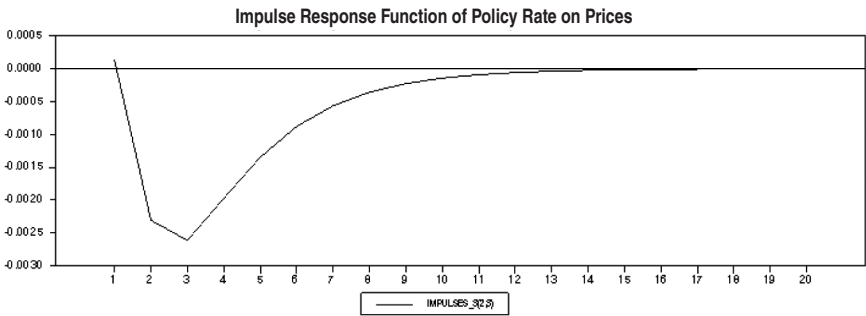


Figure 2.2.3(b) Impulse Response Function of Policy Rate on Price (GDP-Deflator)

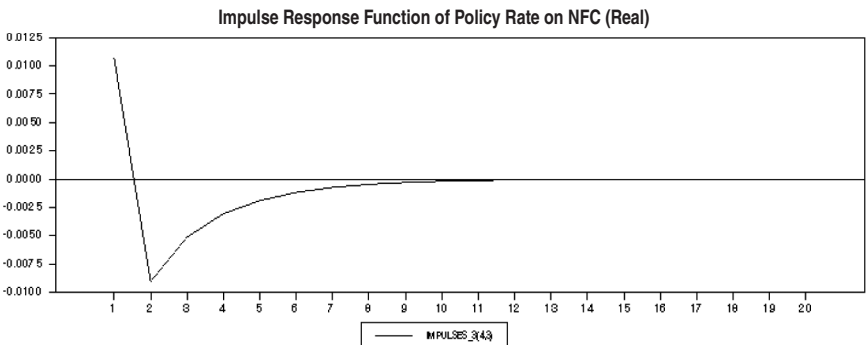


Figure 2.2.3(c) Impulse Response Function of Policy Rate on Real Non-Food Credit

Model 2.2.4: GDP, WPI-All Commodities, Call Money, Real M_1

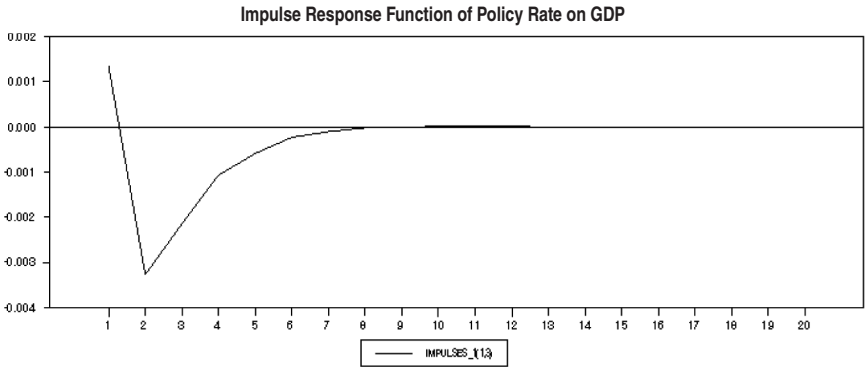


Figure 2.2.4(a) Impulse Response Function of Policy Rate on GDP

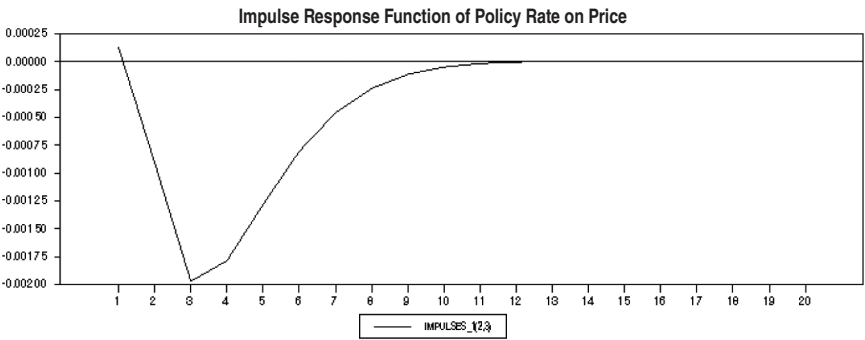


Figure 2.2.4(b) Impulse Response Function of Policy Rate on Price (WPI-All Commodities)

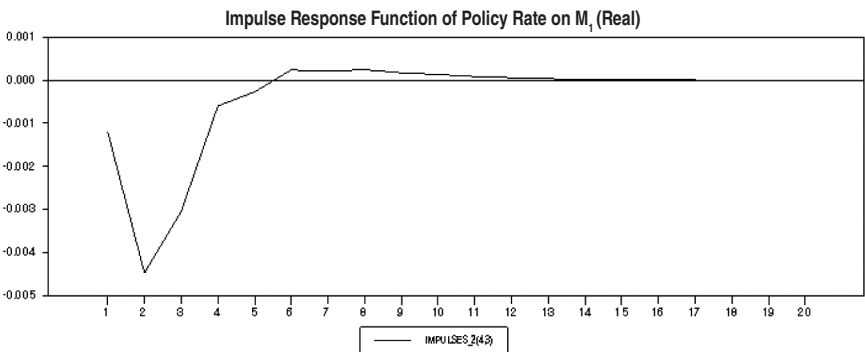


Figure 2.2.4(c) Impulse Response Function of Policy Rate on Real M_1

Model 2.2.5: GDP, WPI-NFMP, Call Money, Real NFC

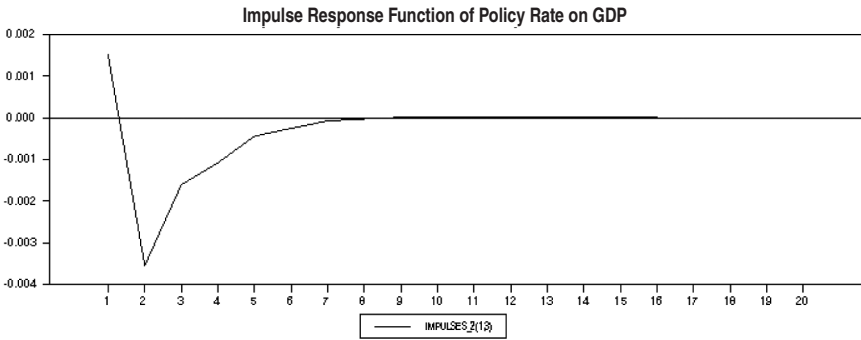


Figure 2.2.5(a) Impulse Response Function of Policy Rate on GDP

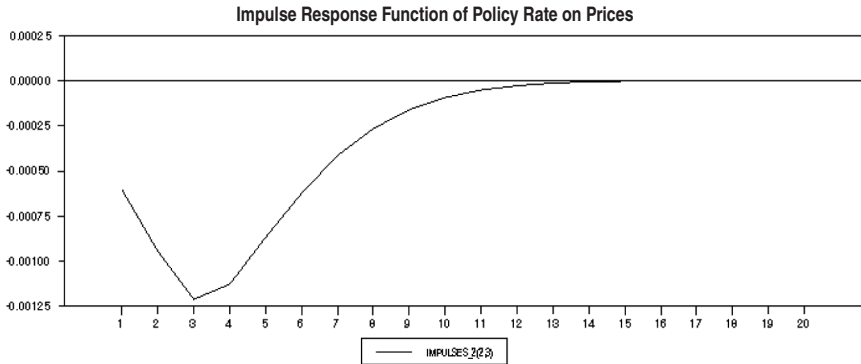


Figure 2.2.5(b) Impulse Response Function of Policy Rate on Price (WPI-NFMP)

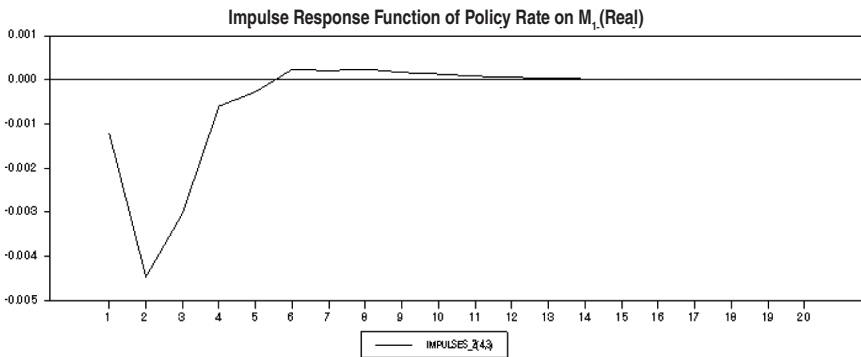


Figure 2.2.5(c) Impulse Response Function of Policy Rate on Real Non-Food Credit

Model 2.2.6: GDP, GDP Deflator, Call Money, Real NFC

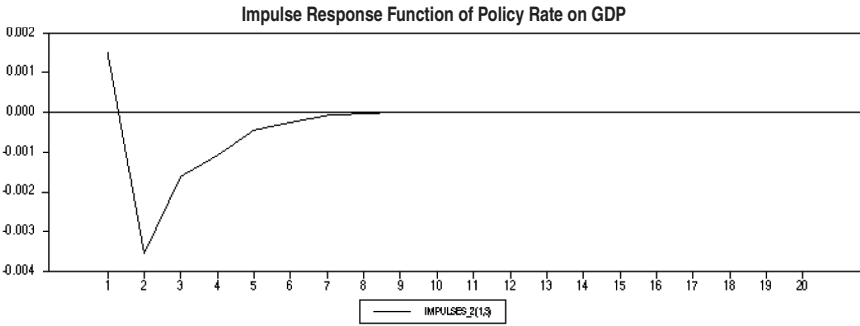


Figure 2.2.6(a) Impulse Response Function of Policy Rate on GDP

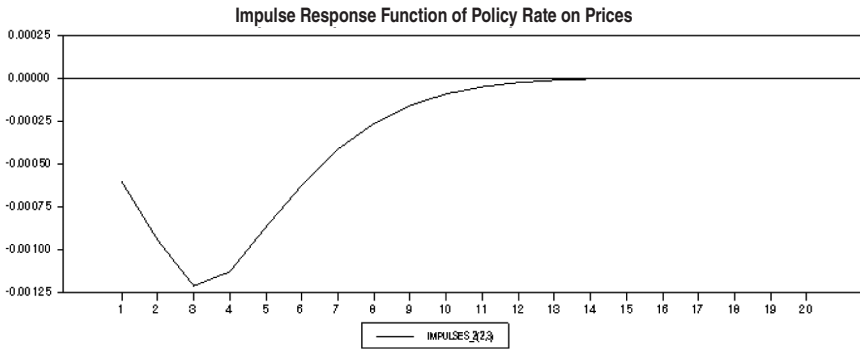


Figure 2.2.6(b) Impulse Response Function of Policy Rate on Price (GDP-Deflator)

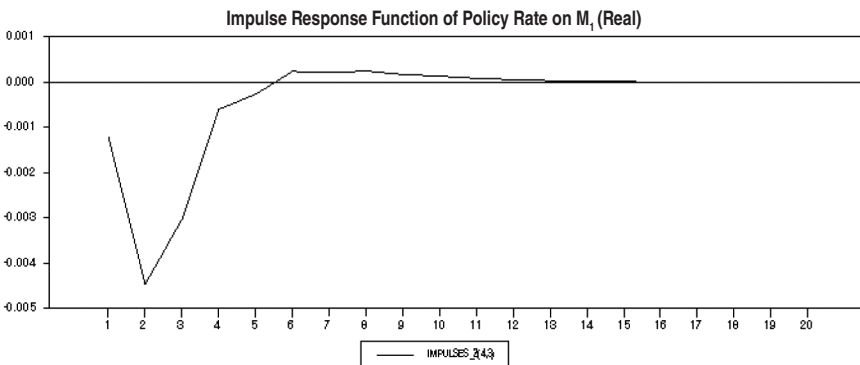


Figure 2.2.6(c) Impulse Response Function of Policy Rate on Real Non-Food Credit

Model 2.2.7: GDP, WPI-All Commodities, Call Money, Real M_3

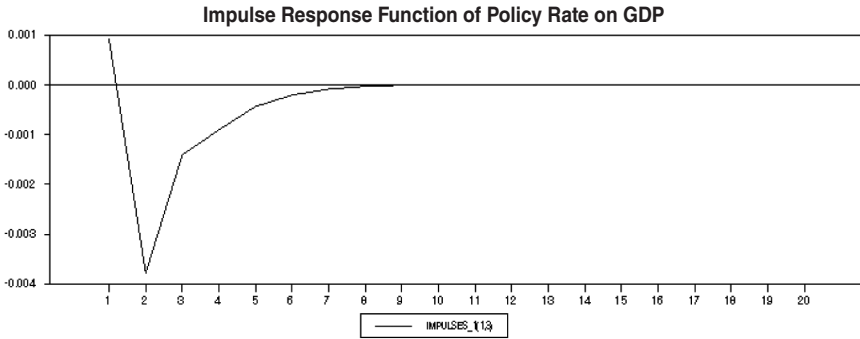


Figure 2.2.7(a) Impulse Response Function of Policy Rate on GDP

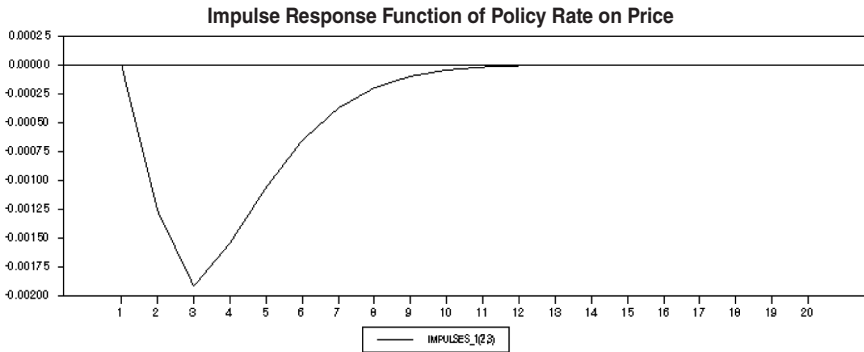


Figure 2.2.7(b) Impulse Response Function of Policy Rate on Price (WPI-All Commodities)

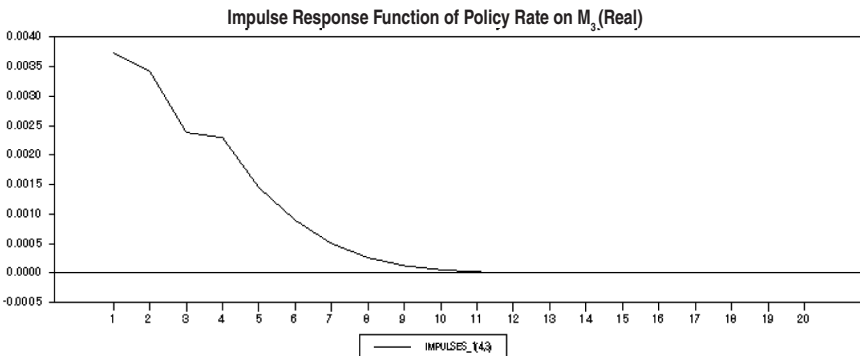


Figure 2.2.7(c) Impulse Response Function of Policy Rate on Real M_3

Model 2.2.8: GDP, WPI-NFMP, Call Money, Real M_3

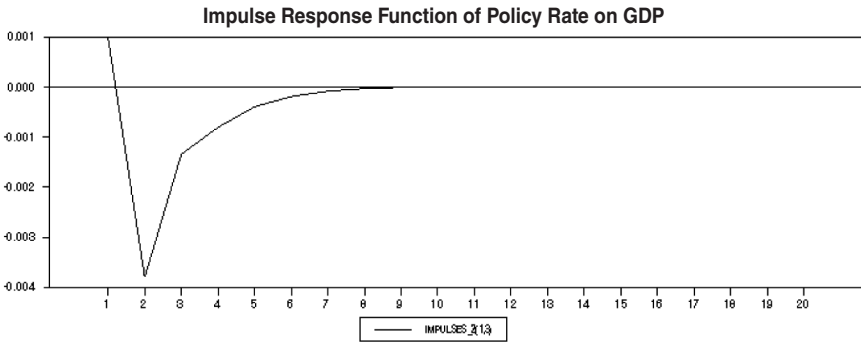


Figure 2.2.8(a) Impulse Response Function of Policy Rate on GDP

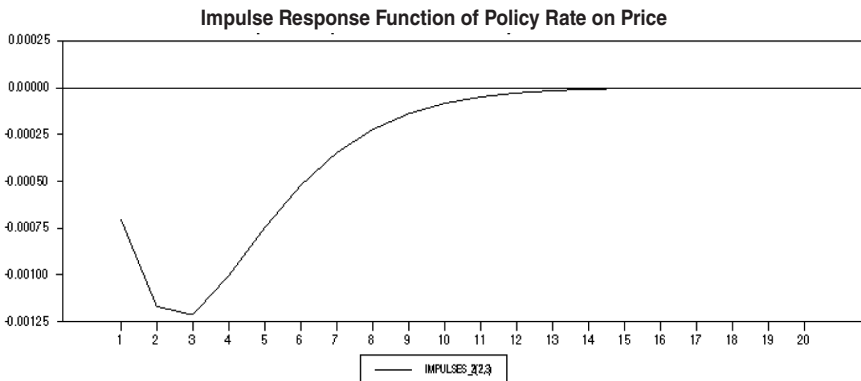


Figure 2.2.8(b) Impulse Response Function of Policy Rate on Price (WPI-NFMP)

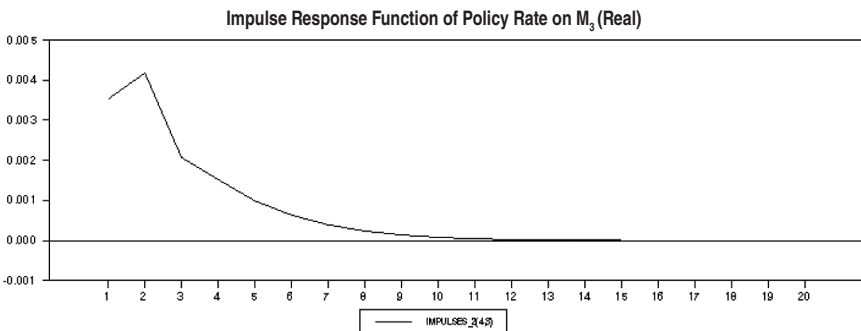


Figure 2.2.8(c) Impulse Response Function of Policy Rate on Real M_3

Model 2.2.9: GDP, GDP Deflator, Call Money, Real M_3

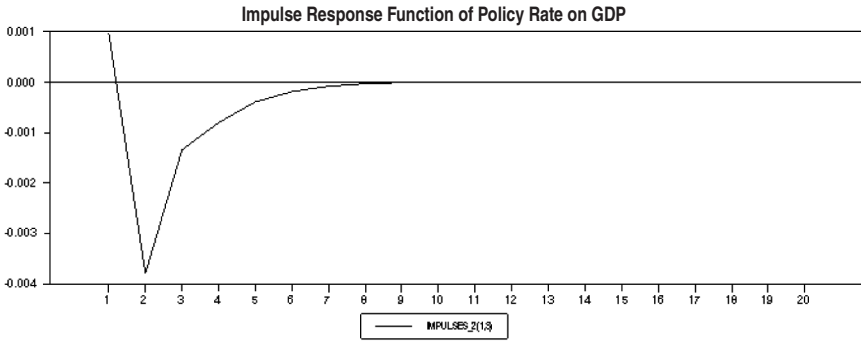


Figure 2.2.9(a) Impulse Response Function of Policy Rate on GDP

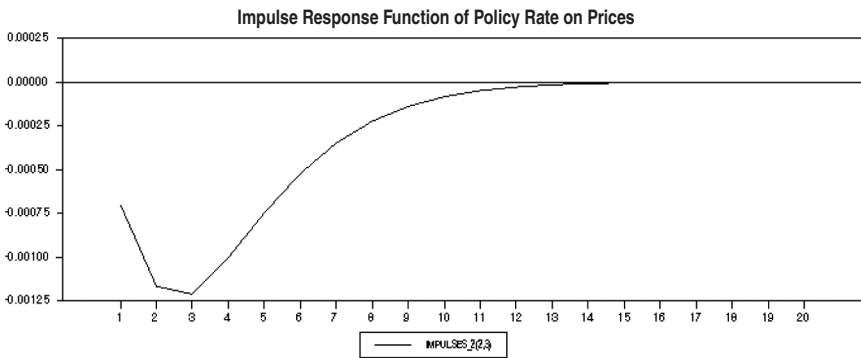


Figure 2.2.9(b) Impulse Response Function of Policy Rate on Price (GDP-Deflator)

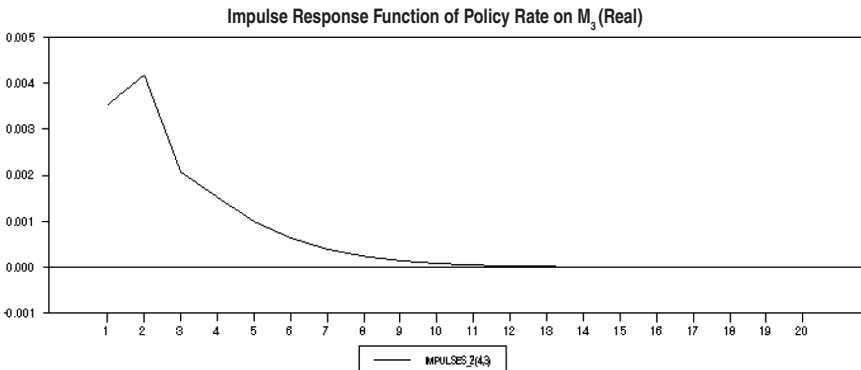


Figure 2.2.9(c) Impulse Response Function of Policy Rate on Real M_3

Model 2.2.10: NAGDP, WPI-All Commodities, Call Money, Real NFC

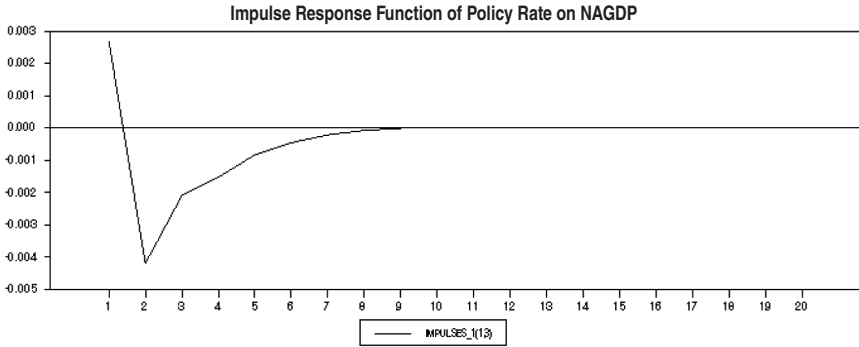


Figure 2.2.10(a) Impulse Response Function of Policy Rate on NAGDP

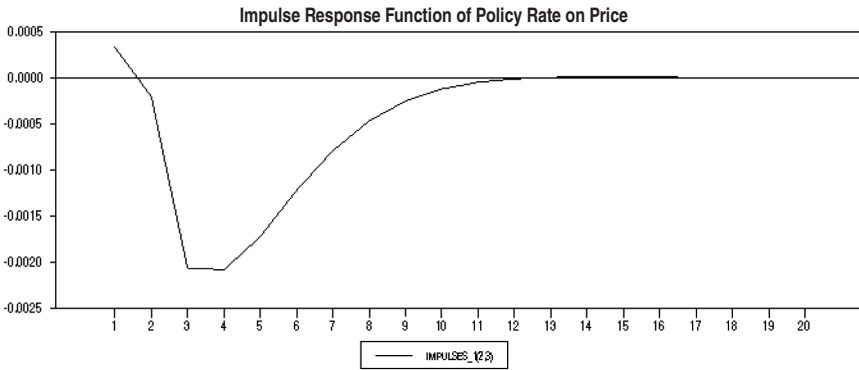


Figure 2.2.10(b) Impulse Response Function of Policy Rate on Price (WPI-All Commodities)

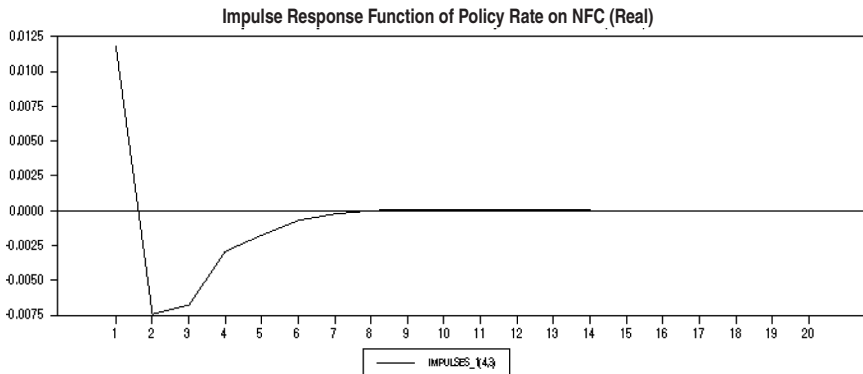


Figure 2.2.10(c) Impulse Response Function of Policy Rate on Real Non-Food Credit

Model 2.2.11: NAGDP, WPI-NFMP, Call Money, Real NFC

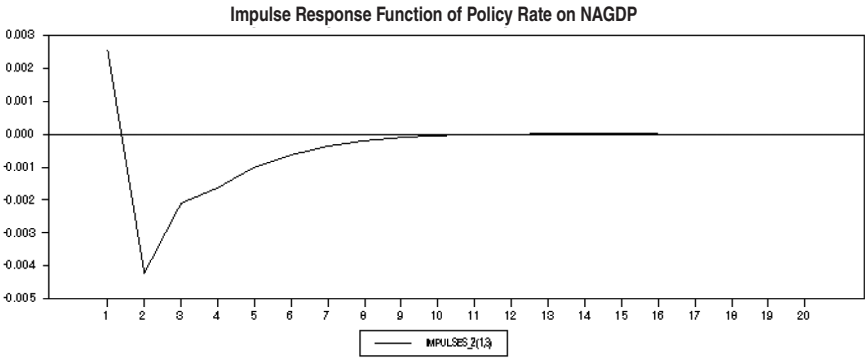


Figure 2.2.11(a) Impulse Response Function of Policy Rate on NAGDP

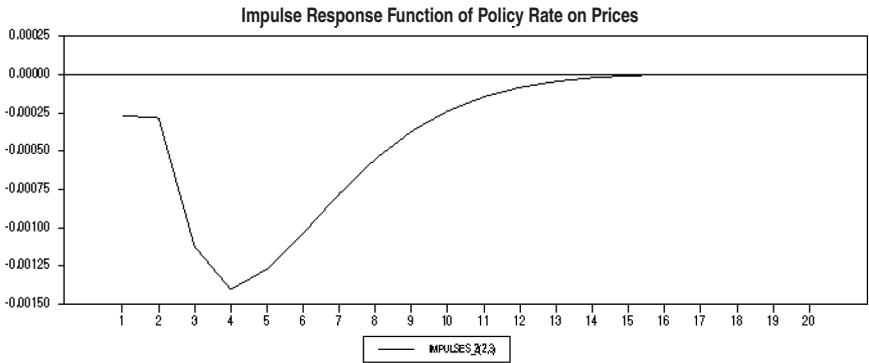


Figure 2.2.11(b) Impulse Response Function of Policy Rate on Price (WPI-NFMP)

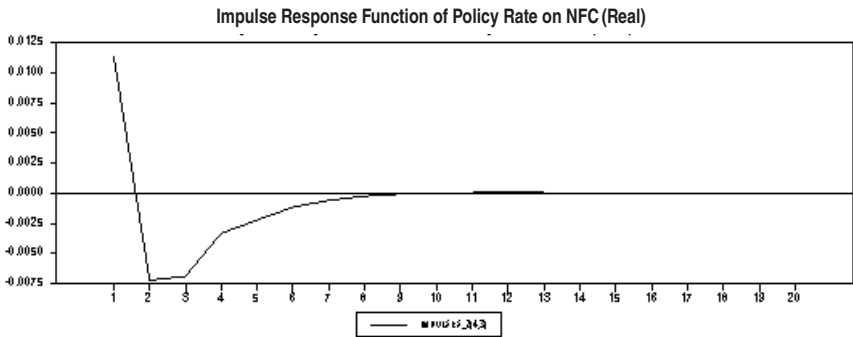


Figure 2.2.11(c) Impulse Response Function of Policy Rate on Real Non-Food Credit

Model 2.2.12: NAGDP, GDP-Deflator, Call Money, Real NFC

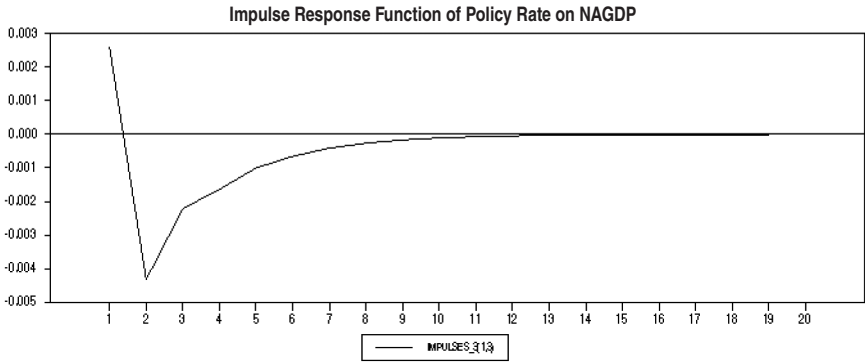


Figure 2.2.12(a) Impulse Response Function of Policy Rate on NAGDP

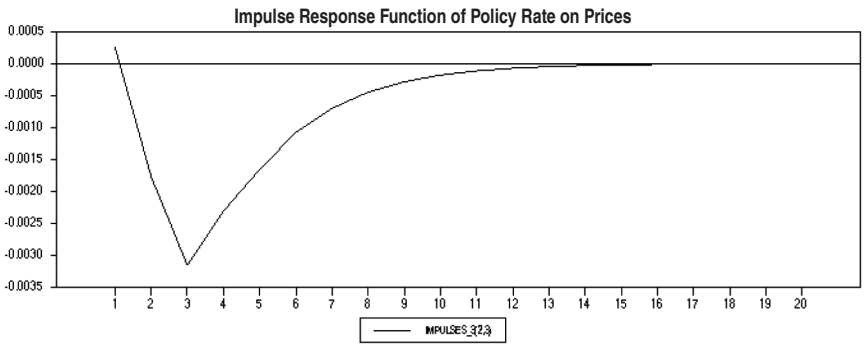


Figure 2.2.12(b) Impulse Response Function of Policy rate on Price (GDP-Deflator)

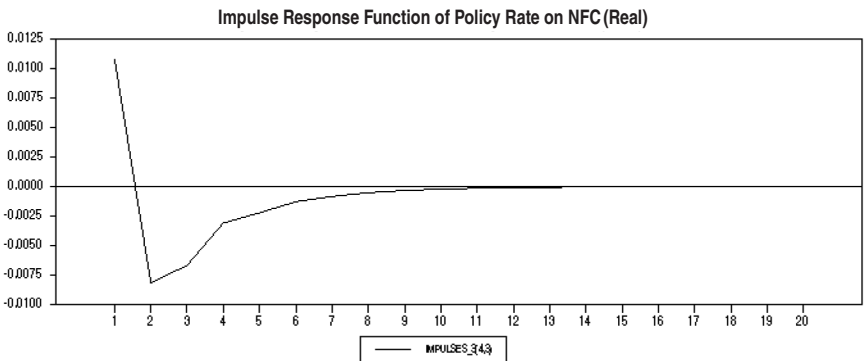


Figure 2.2.12(c) Impulse Response Function of Policy Rate on Real Non-Food Credit

Model 2.2.13: NAGDP, WPI-All Commodities, Call Money, Real M_1

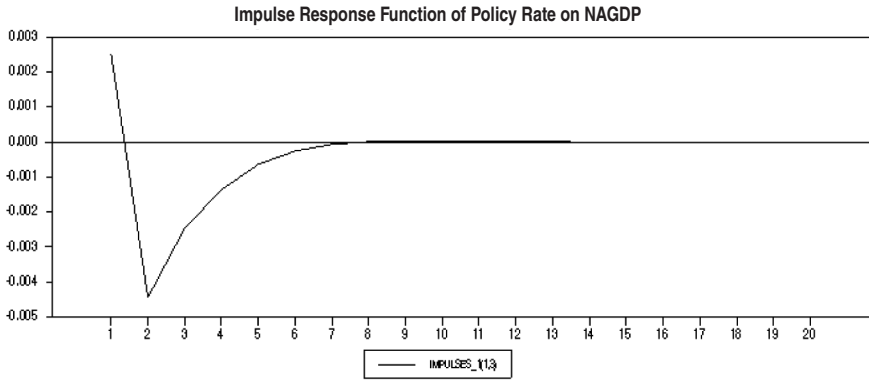


Figure 2.2.13(a) 1 Impulse Response Function of Policy Rate on NAGDP

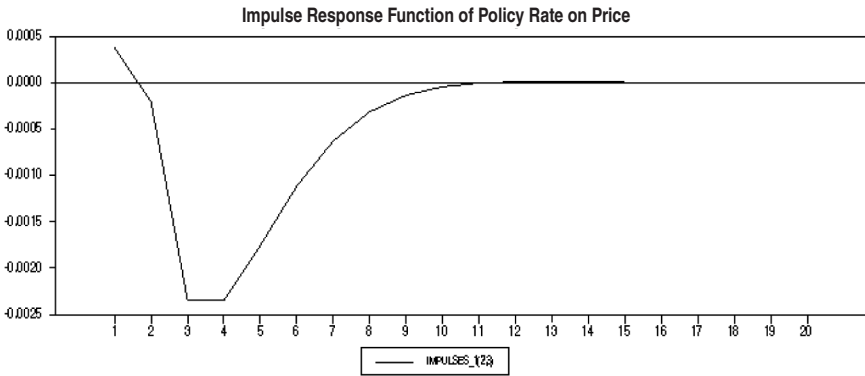


Figure 2.2.13(b) 2 Impulse Response Function of Policy Rate on Price (WPI-All Commodities)

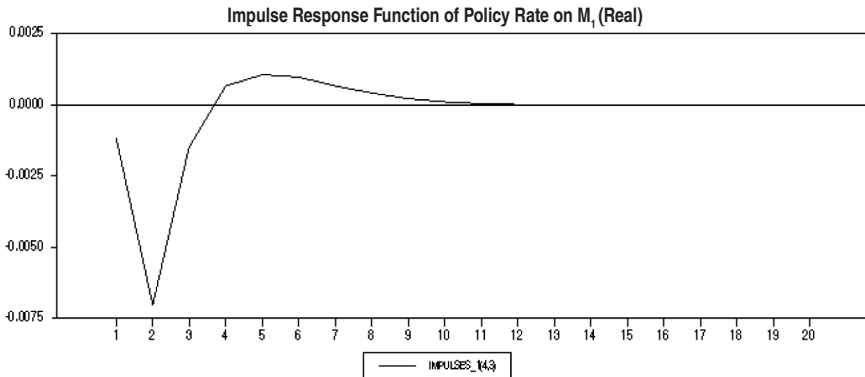


Figure 2.2.13(c) Impulse Response Function of Policy Rate on Real M_1

Model 2.2.14: NAGDP, WPI-NFMP, Call Money, Real M_1

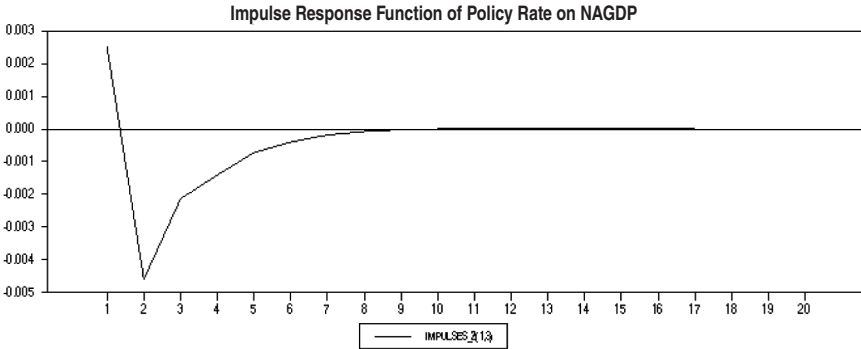


Figure 2.2.14(a) Impulse Response Function of Policy Rate on NAGDP

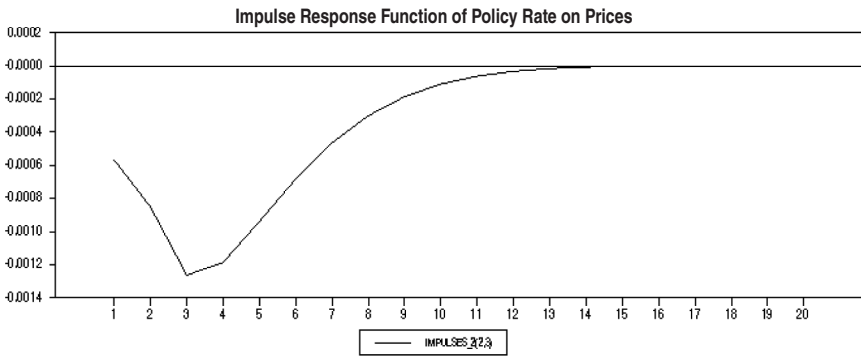


Figure 2.2.14(b) Impulse Response Function of Policy Rate on Price (WPI-NFMP)

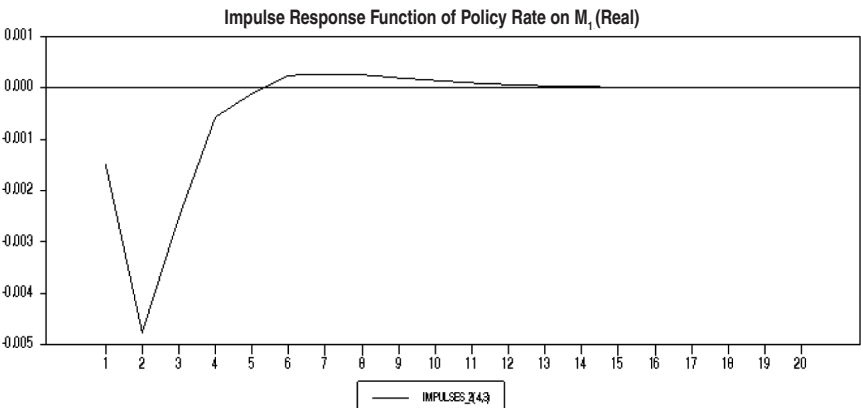


Figure 2.2.14(c) Impulse Response Function of Policy rate on Real M_1

Model 2.2.15: NAGDP, GDP-Deflator, Call Money, Real M_1

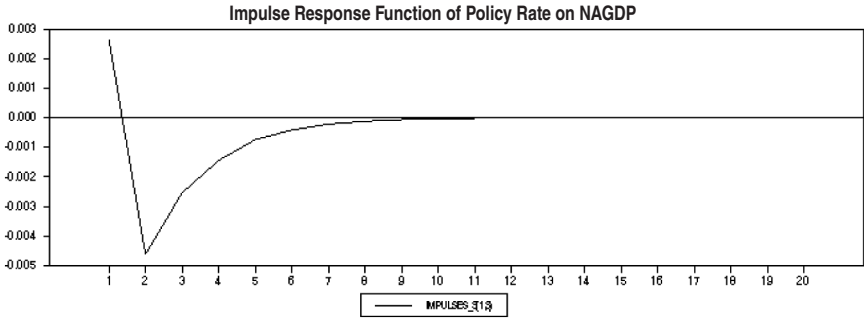


Figure 2.2.15(a) Impulse Response Function of Policy Rate on NAGDP

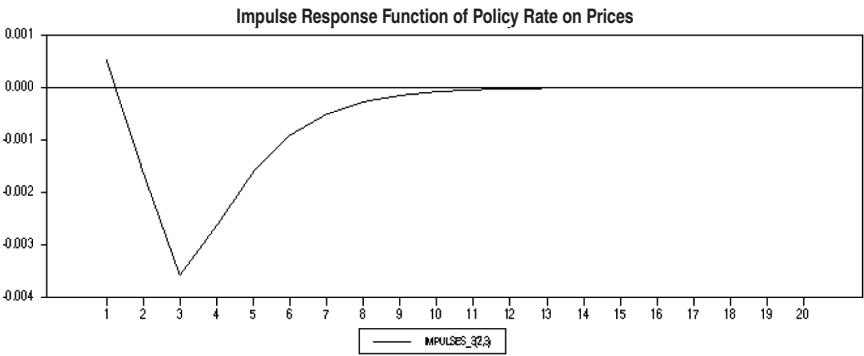


Figure 2.2.15(b) Impulse Response Function of Policy Rate on Price (GDP-Deflator)

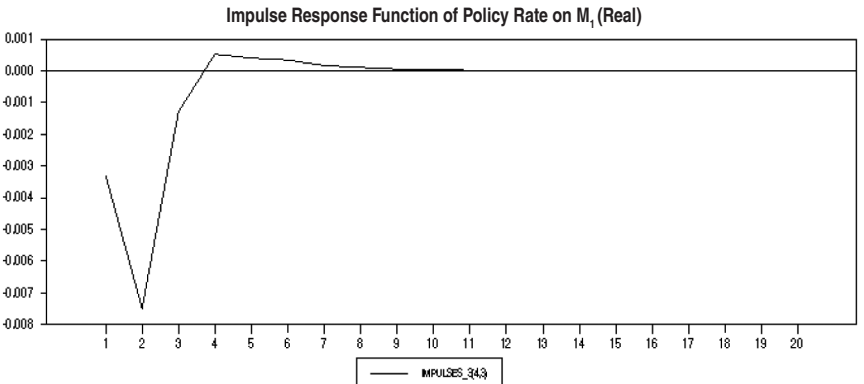
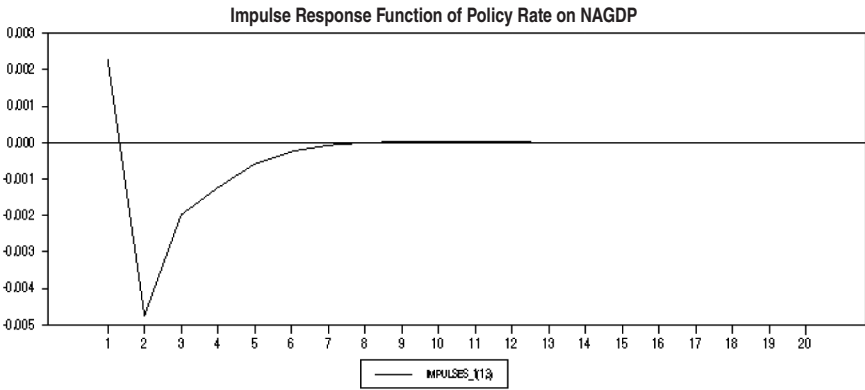
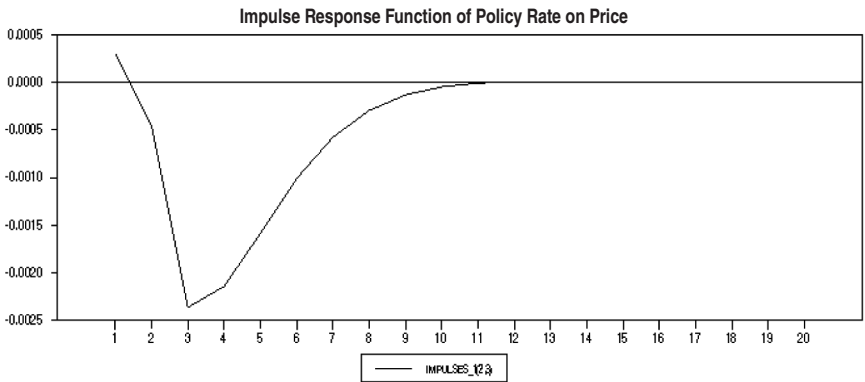
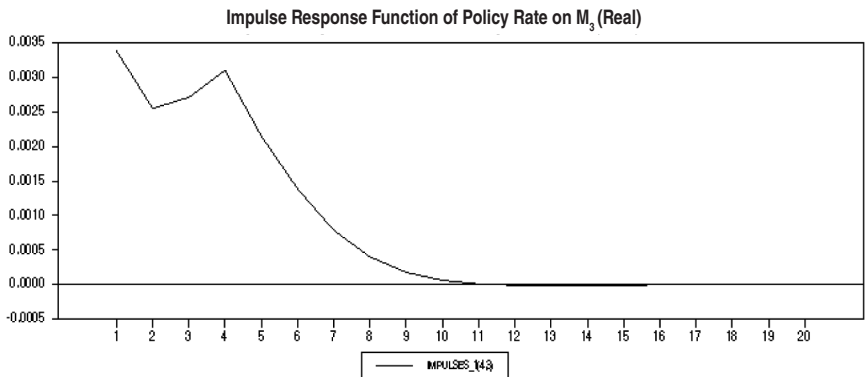


Figure 2.2.15(c) Impulse Response Function of Policy Rate on Real M_1

Model 2.2.16: NAGDP, WPI-All Commodities, Call Money, Real M_3 **Figure 2.2.16(a) Impulse Response Function of Policy Rate on NAGDP****Figure 2.2.16(b) Impulse Response Function of Policy Rate on Price (WPI-All Commodities)****Figure 2.2.16(c) Impulse Response Function of Policy Rate on Real M_3**

Model 2.2.17: NAGDP, WPI-NFMP, Call Money, Real M_3

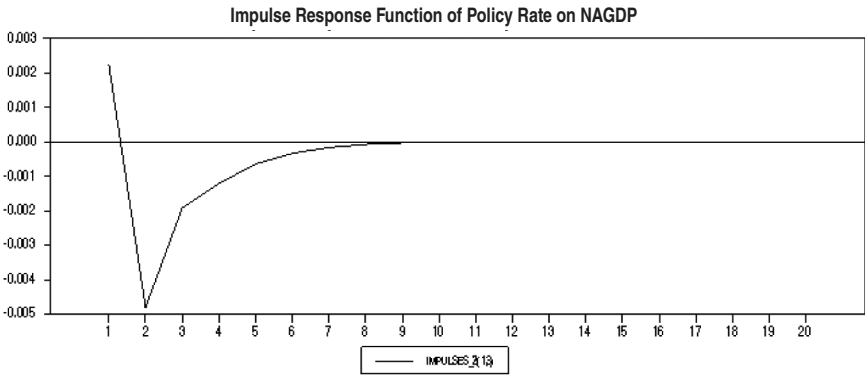


Figure 2.2.17(a) Impulse Response Function of Policy Rate on NAGDP

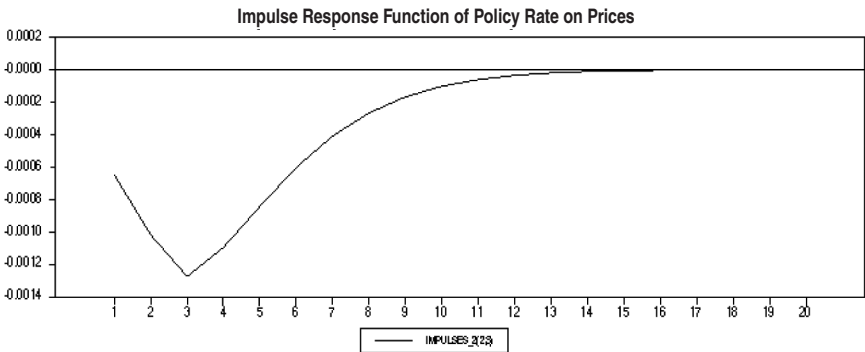


Figure 2.2.17(b) Impulse Response Function of Policy Rate on Price (WPI-NFMP)

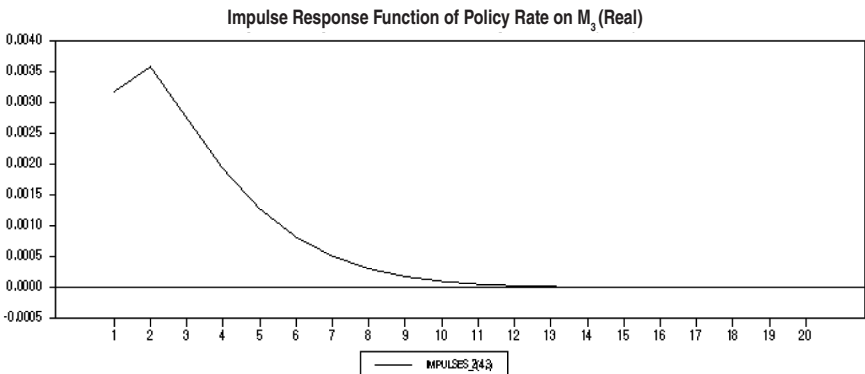


Figure 2.2.17(c) Impulse Response Function of Policy Rate on Real M_3

Model 2.2.18: NAGDP, GDP-Deflator, Call Money, Real M_3

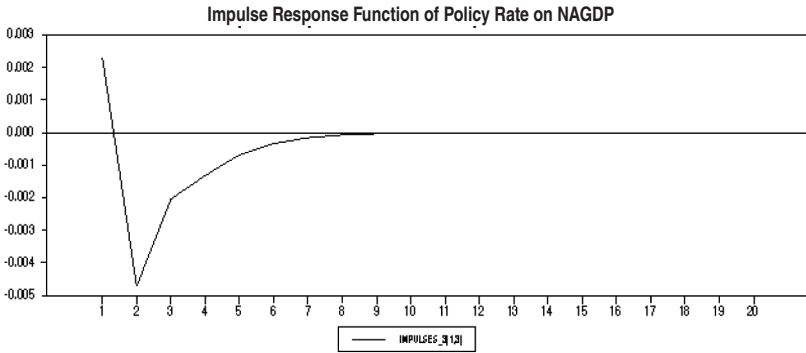


Figure 2.2.18(a) Impulse Response Function of Policy Rate on NAGDP

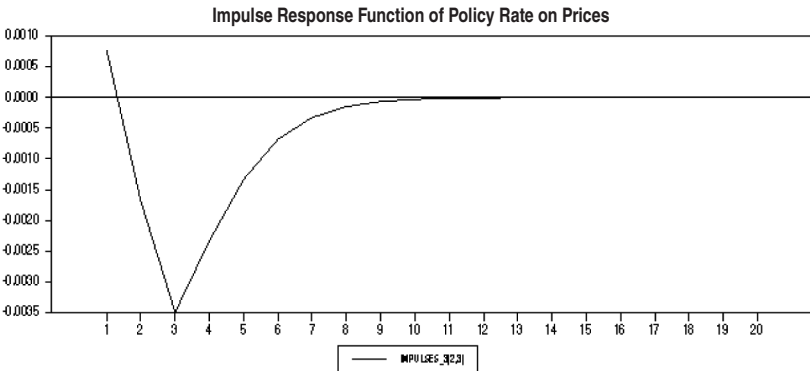


Figure 2.2.18(b) Impulse Response Function of Policy Rate on Price (GDP-Deflator)

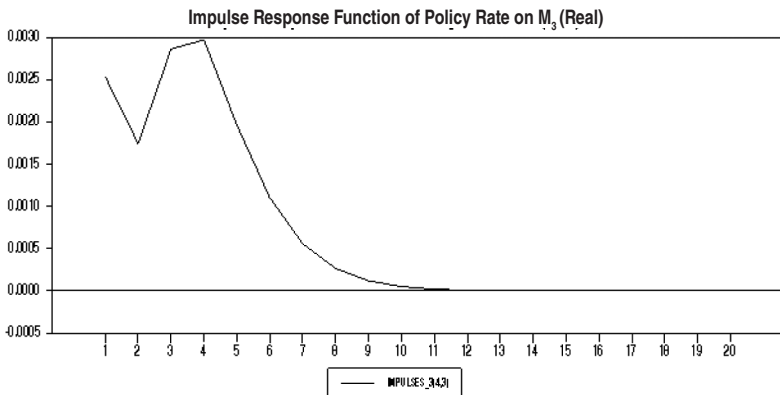


Figure 2.2.18(c) Impulse Response Function of Policy Rate on Real M_3

Model 2.2.19: NAGDP, WPI-All Commodities, Call Money

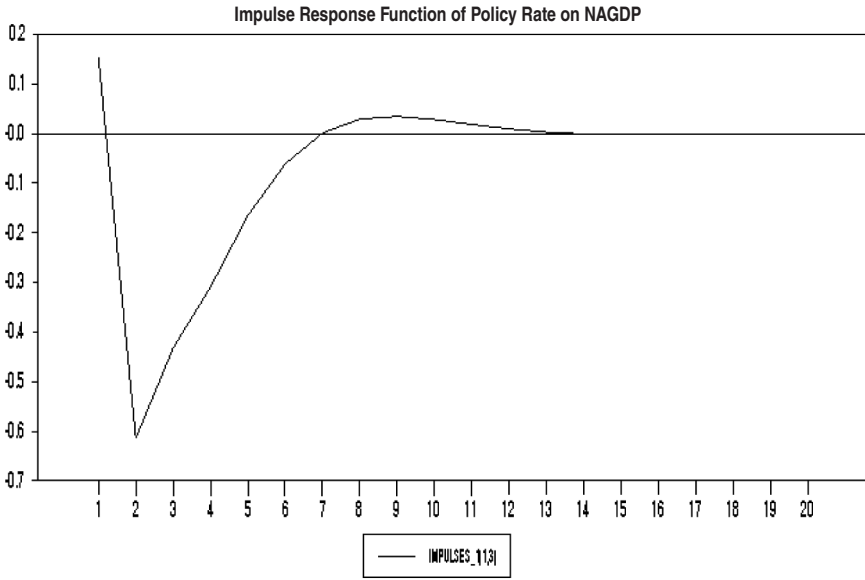


Figure 2.2.19(a) Impulse Response Function of Policy Rate on NAGDP

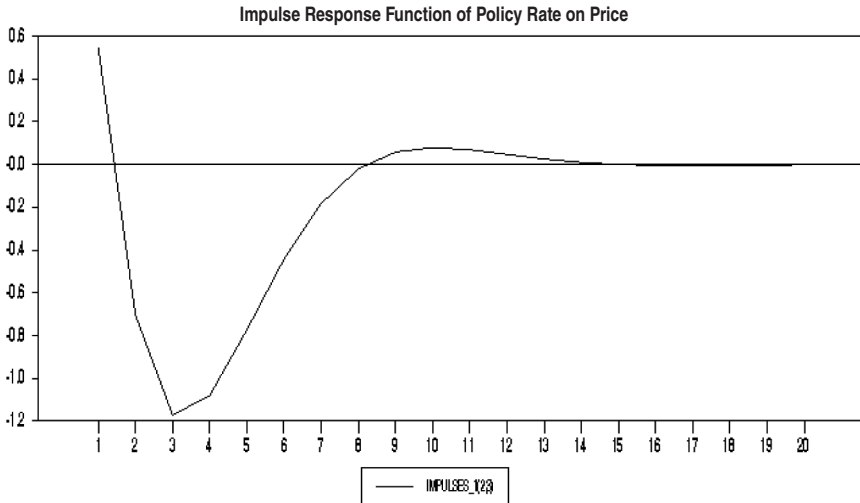


Figure 2.2.19(b) Impulse Response Function of Policy Rate on Price (WPI-All Commodities)

Model 2.2.20: NAGDP, WPI-NFMP, Call Money

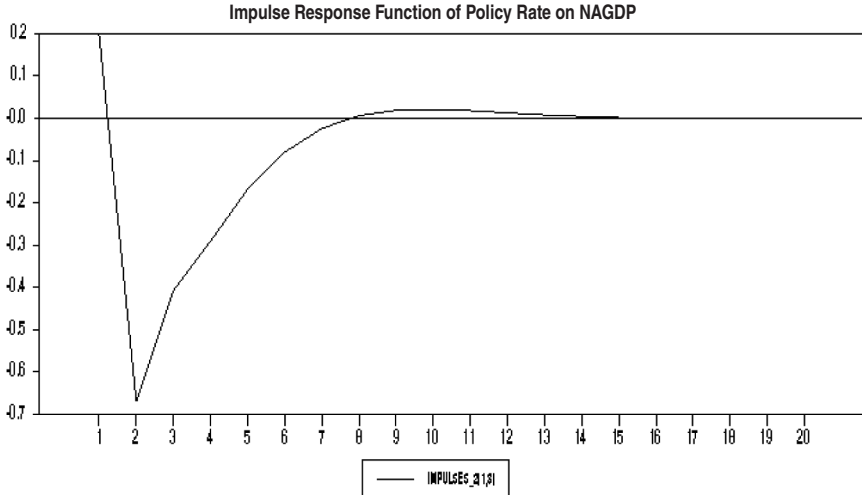


Figure 2.2.20(a) Impulse Response Function of Policy Rate on NAGDP

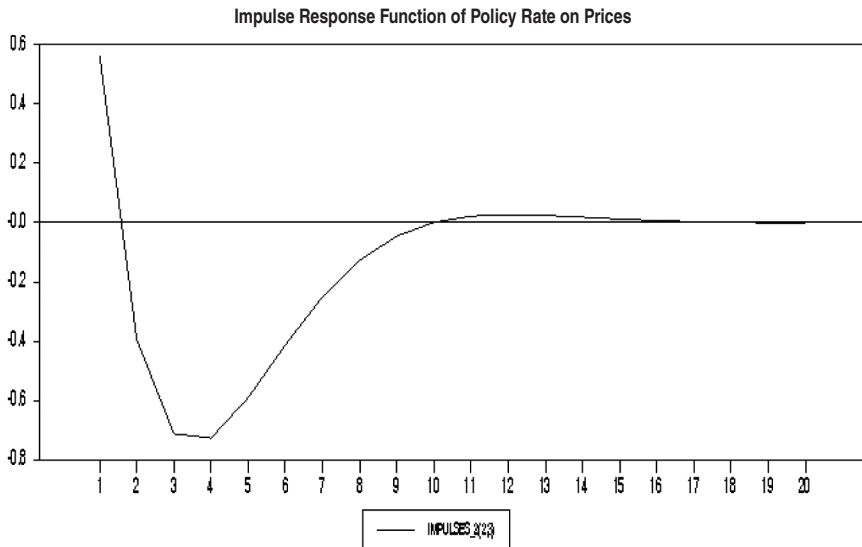


Figure 2.2.20(b) Impulse Response Function of Policy Rate on Price (WPI-NFMP)

Model 2.2.21: NAGDP, GDP Deflator, Call Money

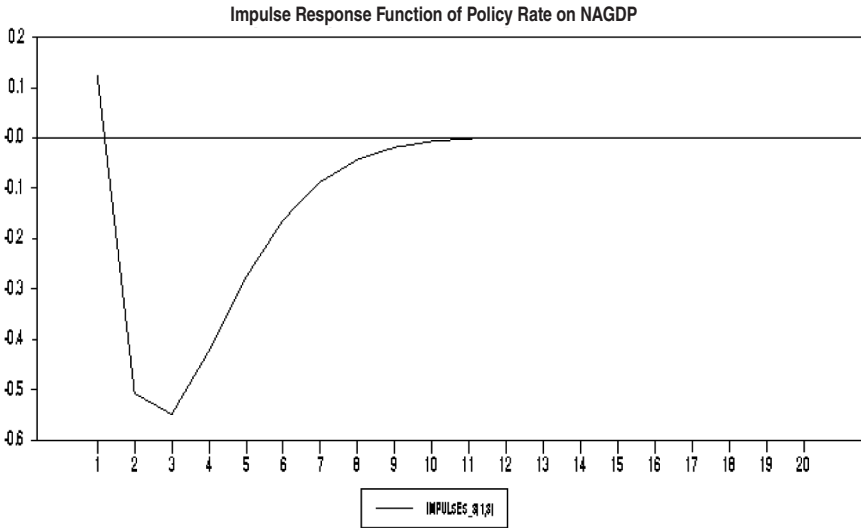


Figure 2.21(a) Impulse Response Function of Policy Rate on NAGDP

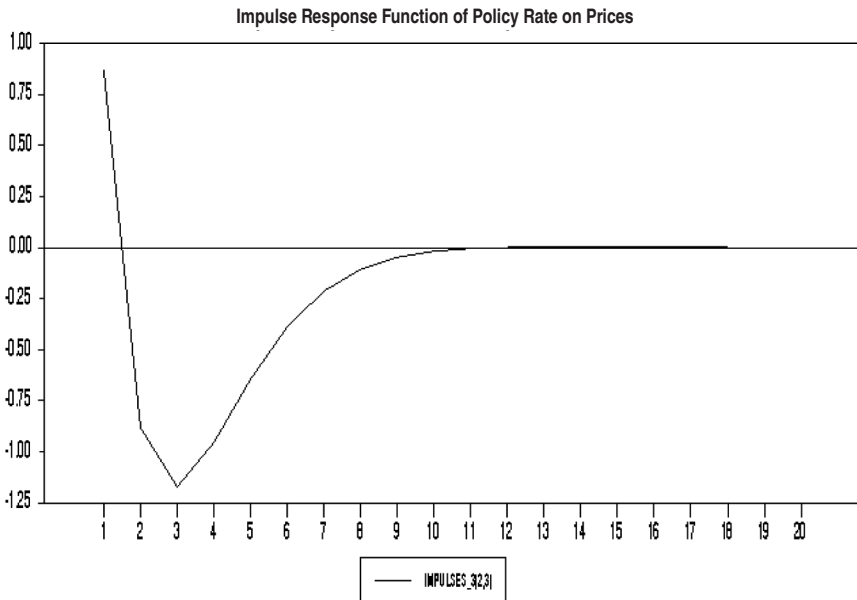


Figure 2.21(b) Impulse Response Function of Policy Rate on Price (GDP Deflator)

Appendix 2.3

Block Exogeneity Test

Block 2.3.1: Macro-variables (output and inflation)

Block 2.3.2: Financial Variables

(Policy Rate, Monetary Aggregates and Credit)

| Serial No. | Dependent variables | Exogenous variables | Test statistic (Chi-square) (p-value) | Remark |
|-------------------------------|---------------------|---------------------|---------------------------------------|----------------|
| Monetary aggregates – Nominal | | | | |
| 1 | GDP, WPI | Call Money, M1 | 9.81 (0.04) | Bi-directional |
| | Call Money, M1 | GDP, WPI | 12.75 (0.01) | |
| 2 | GDP, WPI-NFMP | Call Money, M1 | 11.65 (0.02) | Bi-directional |
| | Call Money, M1 | GDP, WPI-NFMP | 12.84 (0.01) | |
| 3 | GDP,GDP Deflator | Call Money, M1 | 11.91 (0.02) | Bi-directional |
| | Call Money, M1 | GDP,GDP Deflator | 10.97 (0.03) | |
| 4 | NAGDP, WPI | Call Money, NFC | 10.79 (0.03) | Bi-directional |
| | Call Money, NFC | NAGDP, WPI | 10.16 (0.04) | |
| 5 | NAGDP, WPI-NFMP | Call Money, NFC | 12.18 (0.02) | Bi-directional |
| | Call Money, NFC | NAGDP, WPI-NFMP | 9.63 (0.05) | |
| 6 | NAGDP,GDP Deflator | Call Money, NFC | 11.97 (0.02) | Bi-directional |
| | Call Money, NFC | NAGDP,GDP Deflator | 8.06 (0.09) | |
| 7 | NAGDP, CPI-IW | Call Money, NFC | 10.11 (0.04) | Bi-directional |
| Monetary aggregates – Nominal | | | | |
| 8 | GDP, WPI | Call Money, M1 | 8.59 (0.07) | Bi-directional |
| | Call Money, M1 | GDP, WPI | 19.66 (0.00) | |
| 9 | GDP,GDP Deflator | Call Money, M1 | 10.20 (0.04) | Bi-directional |
| | Call Money, M1 | GDP,GDP Deflator | 14.86 (0.00) | |
| 10 | NAGDP, WPI | Call Money, NFC | 9.93 (0.04) | Bi-directional |
| | Call Money, NFC | NAGDP, WPI | 9.35 (0.05) | |
| | Call Money, NFC | NAGDP, CPI-IW | 6.47 (0.17) | |
| 11 | NAGDP, WPI | Call Money, M1 | 13.05 (0.01) | Bi-directional |
| | Call Money, M1 | NAGDP, WPI | 16.23 (0.00) | |
| 12 | NAGDP, WPI-NFMP | Call Money, M1 | 13.00 (0.01) | Bi-directional |
| | Call Money, M1 | NAGDP, WPI-NFMP | 10.11 (0.04) | |
| 13 | NAGDP,GDP Deflator | Call Money, M1 | 14.78 (0.01) | Bi-directional |
| | Call Money, M1 | NAGDP,GDP Deflator | 11.77 (0.02) | |

Appendix 2.4

Block 2.4.1: Policy Rate (Call Money Rate) and Block 2.4.2: Other Variables (i.e., Output, Inflation and Quantity Variables)

Table 2.4.1: Block Exogeneity Test (Output is represented by GDP) and Nominal Monetary Aggregates

| Serial No. | Dependent variables | Exogenous variables | Test statistic (Chi -square) (p-value) | Remark |
|------------|---------------------|---------------------|--|---|
| 1 | Call Money | GDP, WPI, NFC | 4.31 (0.23) | Uni-directional from policy rate to the other variables |
| | GDP, WPI, NFC | Call Money | 8.32 (0.04) | |
| 2 | Call Money | GDP, WPI-NFMP, NFC | 3.96 (0.27) | Uni-directional from policy rate to the other variables |
| | GDP, WPI-NFMP, NFC | Call Money | 8.07 (0.04) | |
| 3 | Call Money | GDP, GDP Defl., NFC | 2.22 (0.53) | Uni-directional from policy rate to the other variables |
| | GDP, GDP Defl., NFC | Call Money | 10.12 (0.02) | |
| 4 | Call Money | GDP, WPI, M1 | 2.39 (0.50) | Uni-directional from policy rate to the other variables |
| | GDP, WPI, M1 | Call Money | 8.37 (0.04) | |
| 5 | Call Money | GDP, WPI-NFMP, M1 | 2.12 (0.55) | Uni-directional from policy rate to the other variables |
| | GDP, WPI-NFMP, M1 | Call Money | 7.77 (0.05) | |
| 6 | Call Money | GDP, GDP Defl., M1 | 1.06 (0.79) | Uni-directional from policy rate to the other variables |
| | GDP, GDP Defl., M1 | Call Money | 9.92 (0.02) | |
| 7 | Call Money | GDP, WPI, M3 | 2.19 (0.53) | No causality |
| | GDP, WPI, M3 | Call Money | 4.69 (0.20) | |
| 8 | Call Money | GDP, WPI-NFMP, M3 | 1.85 (0.60) | No causality |
| | GDP, WPI-NFMP, M3 | Call Money | 4.36 (0.23) | |
| 9 | Call Money | GDP, GDP Defl., M3 | 1.07 (0.78) | Uni-directional from policy rate to the other variables |
| | GDP, GDP Defl., M3 | Call Money | 7.99 (0.05) | |

Table 2.4.2: Block Exogeneity Test (Output is represented by NAGDP) and Nominal Monetary Aggregates

| Serial No. | Dependent variables | Exogenous variables | Test statistic (Chi -square) (p-value) | Remark |
|------------|-----------------------|-----------------------|--|---|
| 1 | Call Money | NAGDP, WPI, NFC | 4.36 (0.23) | Uni-directional from policy rate to the other variables |
| | NAGDP, WPI, NFC | Call Money | 11.96 (0.01) | |
| 2 | Call Money | NAGDP, WPI-NFMP, NFC | 4.04 (0.26) | Uni-directional from policy rate to the other variables |
| | NAGDP, WPI-NFMP, NFC | Call Money | 11.63 (0.01) | |
| 3 | Call Money | NAGDP, GDP Defl., NFC | 2.29 (0.51) | Uni-directional from policy rate to the other variables |
| | NAGDP, GDP Defl., NFC | Call Money | 13.76 (0.00) | |
| 4 | Call Money | NAGDP, WPI, M1 | 2.65 (0.45) | Uni-directional from policy rate to the other variables |
| | NAGDP, WPI, M1 | Call Money | 11.61 (0.01) | |
| 5 | Call Money | NAGDP, WPI-NFMP, M1 | 2.46(0.48) | Uni-directional from policy rate to the other variables |
| | NAGDP, WPI-NFMP, M1 | Call Money | 10.85 (0.01) | |
| 6 | Call Money | NAGDP, GDP Defl., M1 | 1.33 (0.72) | Uni-directional from policy rate to the other variables |
| | NAGDP, GDP Defl., M1 | Call Money | 13.41 (0.00) | |
| 7 | Call Money | NAGDP, WPI, M3 | 2.52 (0.47) | Uni-directional from policy rate to the other variables |
| | NAGDP, WPI, M3 | Call Money | 9.74 (0.02) | |
| 8 | Call Money | NAGDP, WPI-NFMP, M3 | 2.27 (0.52) | Uni-directional from policy rate to the other variables |
| | NAGDP, WPI-NFMP, M3 | Call Money | 9.60 (0.02) | |
| 9 | Call Money | NAGDP, GDP Defl., M3 | 1.39 (0.71) | Uni-directional from policy rate to the other variables |
| | NAGDP, GDP Defl., M3 | Call Money | 13.27 (0.00) | |

Table 2.4.3: Block Exogeneity Test (Output is represented by GDP) and Real Monetary Aggregates

| Serial No. | Dependent variables | Exogenous variables | Test statistic (Chi-square) (p-value) | Remark |
|------------|--------------------------|--------------------------|---------------------------------------|---|
| 1 | Call Money | GDP, WPI, REAL NFC | 5.60 (0.13) | Uni-directional from policy rate to the other variables |
| | GDP, WPI, REAL NFC | Call Money | 7.51 (0.06) | |
| 2 | Call Money | GDP, WPI-NFMP, REAL NFC | 5.77 (0.12) | Uni-directional from policy rate to the other variables |
| | GDP, WPI-NFMP, REAL NFC | Call Money | 6.64 (0.08) | |
| 3 | Call Money | GDP, GDP Defl., REAL NFC | 4.69 (0.20) | Uni-directional from policy rate to the other variables |
| | GDP, GDP Defl., REAL NFC | Call Money | 10.34 (0.02) | |
| 4 | Call Money | GDP, WPI, REAL M1 | 2.31 (0.51) | Uni-directional from policy rate to the other variables |
| | GDP, WPI, REAL M1 | Call Money | 7.96 (0.05) | |
| 5 | Call Money | GDP, WPI-NFMP, REAL M1 | 2.34 (0.51) | No causality |
| | GDP, WPI-NFMP, REAL M1 | Call Money | 5.21 (0.16) | |
| 6 | Call Money | GDP, GDP Defl., REAL M1 | 1.82 (0.61) | Uni-directional from policy rate to the other variables |
| | GDP, GDP Defl., REAL M1 | Call Money | 9.39 (0.02) | |
| 7 | Call Money | GDP, WPI, REAL M3 | 2.38 (0.50) | No causality |
| | GDP, WPI, REAL M3 | Call Money | 5.07 (0.17) | |
| 8 | Call Money | GDP, WPI-NFMP, REAL M3 | 2.40 (0.49) | No causality |
| | GDP, WPI-NFMP, REAL M3 | Call Money | 4.20 (0.24) | |
| 9 | Call Money | GDP, GDP Defl., REAL M3 | 2.32 (0.51) | No causality |
| | GDP, GDP Defl., REAL M3 | Call Money | 6.18 (0.10) | |

Table 2.4.4: Block Exogeneity Test (Output is represented by NAGDP) and Real Monetary Aggregates

| Serial No. | Dependent variables | Exogenous variables | Test statistic (Chi-square) (p-value) | Remark |
|------------|----------------------------|----------------------------|---------------------------------------|---|
| 1 | Call Money | NAGDP, WPI, REAL NFC | 5.59 (0.13) | Uni-directional from policy rate to the other variables |
| | NAGDP, WPI, REAL NFC | Call Money | 11.12 (0.01) | |
| 2 | Call Money | NAGDP, WPI-NFMP, REAL NFC | 5.75 (0.12) | Uni-directional from policy rate to the other variables |
| | NAGDP, WPI-NFMP, REAL NFC | Call Money | 10.57 (0.01) | |
| 3 | Call Money | NAGDP, GDP Defl., REAL NFC | 4.61 (0.20) | Uni-directional from policy rate to the other variables |
| | NAGDP, GDP Defl., REAL NFC | Call Money | 13.66 (0.00) | |
| 4 | Call Money | NAGDP, WPI, REAL M1 | 2.57 (0.46) | Uni-directional from policy rate to the other variables |
| | NAGDP, WPI, REAL M1 | Call Money | 11.19 (0.01) | |
| 5 | Call Money | NAGDP, WPI-NFMP, REAL M1 | 2.64 (0.45) | Uni-directional from policy rate to the other variables |
| | NAGDP, WPI-NFMP, REAL M1 | Call Money | 8.87 (0.03) | |
| 6 | Call Money | NAGDP, GDP Defl., REAL M1 | 2.02 (0.57) | Uni-directional from policy rate to the other variables |
| | NAGDP, GDP Defl., REAL M1 | Call Money | 12.91 (0.00) | |
| 7 | Call Money | NAGDP, WPI, REAL M3 | 2.71 (0.44) | Uni-directional from policy rate to the other variables |
| | NAGDP, WPI, REAL M3 | Call Money | 10.10 (0.02) | |
| 8 | Call Money | NAGDP, WPI-NFMP, REAL M3 | 2.78 (0.43) | Uni-directional from policy rate to the other variables |
| | NAGDP, WPI-NFMP, REAL M3 | Call Money | 9.60 (0.02) | |
| 9 | Call Money | NAGDP, GDP Defl., REAL M3 | 2.63 (0.45) | Uni-directional from policy rate to the other variables |
| | NAGDP, GDP Defl., REAL M3 | Call Money | 11.33 (0.01) | |

Endnotes

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A Macro-prudential Approach to Financial Supervision and Monetary Policy in Emerging Economies

Yung Chul Park

Introduction

A series of financial crises in the 1990s and the 2008–09 global economic crisis has brought to light a number of structural frailties of the financial system, both domestic and global, that have a bearing on the management of financial crisis. They have certainly contributed to a better understanding of the causes and consequences of the build-up of financial imbalances. It is now widely accepted that in contrast to the long held view, consumer price stability is not a sufficient condition for financial stability. Financial imbalances in the form of the boom and bust in asset markets, excessive leverage in financial institutions and households, and deterioration in maturity and currency mismatches in the balance sheets of banks and other financial institutions could pile up in a non-inflationary environment. The unwinding of these imbalances could destabilize the financial system and even trigger a financial crisis, which could in turn cause serious disruptions to the economy and interfere with real sector development.

There has also been a sharp increase in the volatility as well as the volume of cross-border capital movements with deepening of integration of financial markets of individual economies, both at the regional and global level. In a globalized economy, financial turbulences in one country could easily spill over into neighbouring economies including even those with strong and sound fundamentals,

destabilizing their financial systems as well. Finally, experiences with managing financial crises in both advanced and emerging economies suggest that the conduct of monetary policy could exacerbate rather than prevent the build-up of systemic risk unless it is complemented by other policy measures.

These changes in the financial landscape have underlined the need to strengthen the foundation of the domestic financial system in order to improve its resilience to external shocks and develop new policy instruments that could complement monetary and fiscal policy in safeguarding the economy against financial instability. The search for new policy tools has led to a reorientation of macroeconomic dimensions of micro-prudential supervision.

In the wake of the 1997–90, Asian financial crisis, Crockett (2000) proposed that micro-prudential supervision and regulation, which had been traditionally directed to protecting depositors and investors, should be reoriented towards maintaining financial stability by ‘marrying the micro and macro-prudential dimensions of financial stability’. This was followed by the construction of a macro-prudential framework for financial supervision and regulation (Borio, 2003), which has been further refined by a series of papers by the staff of the Bank for International Settlements (BIS).

Since the eruption of the 2008–09 global economic crisis, macro-prudential policy has taken centre stage of the discussion regarding the assessment of health and safety of the financial system and prevention of future financial crises. The International Monetary Fund (IMF) programme for the assessment of systemic financial stability and the growing attention central banks and other policy authorities are paying to monitoring, analysing and formulating policy responses all bear witness to the growing importance of macro-prudential supervision as a new macroeconomic policy.

Although there has been a growing literature on macro-prudential policy in recent years, there appears to be considerable disagreement on its scope and effectiveness.¹ Indeed, there is neither a widely accepted definition of financial stability nor an appropriate operational framework for macro-prudential policy. It is generally agreed that

efficiency of monetary policy would improve, if complemented by macro-prudential supervision. Identification of the contour of a new system of coordination of the two policies has proved difficult. This is because the new system needs to be designed in a way that will avoid potential conflict in which the effects of the two policies cancel out each other as macro-prudential policy has macroeconomic spillovers, whereas monetary policy affects risk-taking behaviour of financial market participants.

In this chapter, an attempt is made to clarify some of the analytical as well as operational issues related to the construction of a macro-prudential policy framework for financial supervision and regulation, in particular interactions between monetary and macro-prudential policy. To set the stage for the discussion, the following section examines the operational definition, the rationale behind and the scope of macro-prudential policy in the context of emerging economies. This is followed by a discussion on the role and effectiveness of macro-prudential policy. Next, Korea's experience in managing macro-prudential policy is analysed. The next section is devoted to outlining an appropriate scope and modality of macro-prudential supervision. Concluding remarks are in a final section.

Role and Scope of Macro-prudential Policy

Definition and Rationale

Monetary policy should be an integral component of any policy framework for managing financial imbalances. As the monetary authority, the central bank does, and in fact has to, monitor and assess financial market developments as part of the process of adjusting the stance of monetary policy. Depending on the gravity of the situation, it may use its policy tools to alleviate financial disruptions threatening systemic risk. However, it would not do so unless they imperil price stability for which the central bank is primarily responsible. It would also be reluctant to intervene largely because it does not have effective instruments to lean against the financial cycle or to restrain excessive leverage and risk taking of financial market participants. For example,

a higher policy rate may be able to stabilize high asset prices, but when speculation sets in, it is likely to do so at the cost of a larger output gap, if consumer price inflation is below the target rate (Blanchard *et al.* 2010).

If monetary policy is not an appropriate instrument – in scope and effectiveness – for addressing the buildup of systemic risk, then questions arise as to whether the financial regulatory authorities could shoulder much of the responsibility for assessing and safeguarding financial stability. Indeed, if individual financial institutions are healthy, sound and efficiently managed, the likelihood of financial distress is expected to decline.

Since the regulatory authorities are entrusted with enforcing prudential standards and codes of good behaviour at these institutions, they could contain contagion of insolvency of a financial institution to fend off a run on the entire financial system. Prudential supervision of individual institutions or micro-prudential supervision is therefore a critical component of any tool kit for financial stability and strengthening it is no less essential than before. The regulatory authorities should assume a large part of the financial stability function.

While it is an essential component, as long as it is bound by safety of individual institutions micro-prudential supervision will not be a suitable tool for financial stabilization. This focus may result in excessive protection to undermine the safety of individual institutions it supervises (Crockett, 2000). Furthermore, the soundness of individual institutions is neither a necessary nor a sufficient condition for stability of the financial system as a whole. As Goodhart (2004) points out, depending on the nature of the inter-linkages among financial institutions and markets, financial systems containing individually weak institutions may nevertheless be systemically robust and vice versa.²

The emphasis on individual institutions does not also leave much room for micro-prudential supervision to weigh up or deal with an increasing array of macroeconomic risk factors common to all financial institutions, such as a high degree of volatility of capital flows, the boom–bust cycle in asset markets and sudden changes in market

sentiment and expectations. This limitation is likely to cause a failure in monitoring the increase in systemic risk and taking appropriate remedial actions.

The above two constraints associated with the institution-specific focus have led to reorientation and refining of the macroeconomic dimensions of micro-prudential supervision as means of managing systemic risk. Macro-prudential policy is defined as 'the use of prudential tools with the explicit objective of promoting the stability of the financial system as a whole, not necessarily of the individual institutions within it' (Clement, 2010). It intended to prevent the buildup of systemic risk, which could destabilize the financial system and, as a consequence, the whole economy.³

According to a BIS paper (Committee on the Global Financial System, 2010), systemic risk is 'a risk of disruption to financial services that is caused by an impairment of all or parts of the financial system and has the potential to have serious negative consequences for the real economy'. Borio (2009) and Hannoun (2010) identify two types of disruption that could cause the accumulation of financial imbalances. One type is the financial cycle – the pro-cyclicality over the business cycle in lending at banks and other non-bank financial institutions. Another is a cross-dimensional disruption arising from a direct exposure of financial institutions to a set of common shocks or risk factors, as in the case of holding the same or similar assets, or an indirect exposure through the network linkages, as in the case of assuming counterparty risks.⁴

To be sure, these objectives are not mutually exclusive, as a greater resilience of the financial system would enable the system to adjust to financial cycles better (Crockett, 2000 and Borio, 2002). In contrast, the micro-prudential objective is to limit idiosyncratic risk that individual financial institutions are exposed to. The macro-prudential supervisory standard is derived from a top-down approach, whereas the micro-prudential one from a bottom-up approach. The systemic risk the macro-prudential approach deals with is endogenous as it is determined by the collective behaviour of individual institutions, whereas the idiosyncratic risk is exogenous. The

differences between the two supervisory approaches are summarized in Table 3.1.

Table 3.1. Micro and Macro Approach

| | Macro-prudential | Micro-prudential |
|--|---|---|
| Objective | Limiting systemic risk of the financial system: Mitigating the failure of a large segment of the financial system | Limiting idiosyncratic risk of individual institutions: Protection of depositors and investors |
| Implementation of supervisory controls | Top-down: setting prudential control in terms of the probability and costs of systemic distress | Bottom-up: Setting and aggregating prudential control in relation to the risk of each institution |
| Characteristics of risk | Endogenous: Originating in the collective behaviour of and interactions between institutions | Exogenous: Given to individual institutions and the disregard of feedback of collective actions |
| Common exposure to systemic risk | Relevant and important: Causes of the fallacy of composition | Irrelevant |
| Use of instruments | Standard prudential tools plus linking provisioning and pricing of risk to the volume of loan | Uniform solvency standards and codes of conduct |
| Focus of supervision | (i) A greater weight given to banks and larger and more complex institutions; (ii) Market monitoring; and (iii) Countercyclical orientation | Protection of individual institutions |

Sources: Crockett (2000) and Borio (2003 and 2009)

In recent years, the creation of a unified financial supervising system independent from the central bank has also brought to the fore the need to define the scope, tools and division of labour in conducting macro-prudential policy. If a central bank was engaged in some type of macro-prudential supervision before the supervisory oversight was separated out and transferred to a new independent institution, it would certainly use micro-prudential tools to complement its monetary policy, tightening in the up-phase while relaxing them in the down-phase of the business cycle. With the creation of an

independent supervising authority, then it stands to reason that the stability function needs to be shared by both the central bank and the supervisory authority and that the central bank has to coordinate its conduct of monetary policy with the financial supervisory agencies.

Tools of Macro-prudential Policies

There is a growing literature on macro-prudential policy, yet the precise contour of the macro-prudential supervision in monitoring, analysing and participating in the designing of policy responses to an impending financial stress is yet to be defined. The advocates of macro-prudential orientation of financial supervision do not necessarily propose either creating new prudential controls or adding new functional responsibilities to the supervisory authority. They are arguing for the adjustment of the traditional modality of supervision in a way that will contribute to mitigating systemic risks.

For analytical purposes, the tools for macro-prudential supervision are divided into the two categories of time, and cross-sectoral, dimensions as shown in Table 3.2. In each category, the tools are also divided into those developed for mitigating systemic risk and recalibrated micro-prudential tools. Most of the instruments with a cross-sectoral dimension in Table 3.2 are micro-prudential tools recalibrated for macroeconomic objectives of sustaining financial stability.⁵ They take the form of restrictions or incentives related to financial firms' balance sheets designed and implemented to contain distress of individual financial institutions. As Hannoun (2010) argues, they could be utilized to mitigate systemic risk as they can complement the instruments of monetary policy. Some of the instruments such as capital and liquidity surcharges on Systemically Important Financial Institution (SIFI), restrictions on leverage in particular types of lending and currency mismatches may be used to strengthen resilience of the financial system. As in the case of SIFIs, the regulatory authorities may separate out vital institutions to reflect their potential threat to the stability of the financial system (Borio, 2009).

Table 3.2 Macro-prudential Policy Tools

| Tools | Risk Dimensions | |
|---|--|---|
| | Time-dimension | Cross-sectoral Dimension |
| 1. Instruments developed specifically to mitigate systemic risk | | |
| | <ul style="list-style-type: none"> • Countercyclical capital buffers • Through-the-cycle valuation or margins or haircuts for repos • Levy on non-core liabilities • Countercyclical change in risk weights for exposure to certain sectors | <ul style="list-style-type: none"> • Systemic capital surcharges on SIFIs • Systemic liquidity surcharges on SIFIs • Levy on non-core liabilities • Higher capital charges for trades not cleared through CCPs |
| 2. Recalibrated instruments | | |
| | <ul style="list-style-type: none"> • Time-varying LTV, Debt-To-Income (DTI) and Loan-To-Income (LTI) Caps • Time-varying limits in currency mismatch or exposure (e.g. real estate) • Time-varying limits on loan-to-deposit ratio • Time-varying caps and limits on credit or credit growth • Dynamic provisioning • Stressed VaR to build additional capital buffer against market risk during a boom • Rescaling risk-weights by incorporating recessionary conditions in the probability of default assumptions (PDs) | <ul style="list-style-type: none"> • Power to break up financial firms on systemic risk concerns • Capital charge on derivative payables • Deposit insurance risk premiums sensitive to systemic risk • Restrictions on permissible activities (e.g. ban on proprietary trading for systemically important banks) |

Source: IMF (2011)

A host of micro-prudential tools with a time dimension may also be reoriented to help tame the pro-cyclicality of lending by banks and other non-bank financial institutions. As shown in Table 3.2, those developed specifically for lessening systemic risk include countercyclical capital charges, forward-looking provisioning for loan losses and levy on non-core deposits. Recalibrated tools include the loan-to-value ratio, the repayment period, margin requirements, capital requirements against real estate lending and the countercyclical adjustment of exposure to

the real estate sector to be tightened in the upswing and loosened in the downswing phase (Hannoun, 2010).⁶ These tools could be adjusted frequently and quantitatively.⁷

Effectiveness of Macro-prudential Policy in Leaning against Financial Cycle⁸

Fungibility of Money: Ineffectiveness of Selective Credit Control

In a situation where bubbles are in the making in the markets for real or financial assets, the financial supervisory authority may consider invoking macro-prudential regulations to reduce mortgage lending at banks and other non-bank financial intermediaries by using two types of instruments. The first includes some of the recalibrated micro-prudential tools such as the Loan to Value (LTV) and Debt to Income (DTI) ratios, which are adjusted to control the supply of mortgage loans. If these two instruments proved to be inadequate, the supervisory authority may strengthen its control by employing the second type reserved for tempering pro-cyclicality in bank lending such as countercyclical capital charges, dynamic loan-loss provisioning and capital conservation rules for banks. Implementation of these two types of instruments entails quantitative – rather than price – control of the availability of sectoral as well as aggregate bank credit. This section argues that because of fungibility of money and potential conflict with monetary policy these tools lose much of their effectiveness in suppressing the bubbles.

In order to elaborate on this argument, suppose that the regulatory authority lowers the ceilings of the two ratios – LTV and DTI – to stave off a housing market boom and that there is no change in the stance of monetary policy. The squeeze on mortgage lending is likely to discourage borrowing for consumption demand – the purchases of houses for their services – but not necessary for the investment demand by those investors seeking higher capital gains if housing prices are expected to rise continuously.

Under these circumstances, as long as the level of total bank lending is left unchanged, banks will be able to extend more of other types of

business and consumer loans with the funds released from housing finance they curtail. However, if the expected real return on housing investment is perceived to be higher than the returns on other assets, many of the borrowers taking out other non-mortgage bank loans are likely to invest the bulk of their loan proceeds in housing.⁹ This results from the fungibility of money and imperfections in *ex post* loan use monitoring that may result in the diversion of non-mortgage loans.

Given the fungibility of money, it appears that in countries where housing has become a good substitute for financial assets and banks dominate financial intermediation, restrictions on mortgage lending alone may not be effective in preventing the housing market bubble. To be effective, they may need to be complemented by an overall cutback in aggregate bank credit through, for instance, an increase in loan-loss provisioning to curtail further the availability of housing finance.

However, the overall cutback is likely to create two types of spillover problems. One problem is that once housing speculation gathers forces, as shown by the Korean experience discussed in section 4, even the simultaneous squeeze on both the sectoral and aggregate supply of bank credit may not be enough to keep housing speculators at bay. This is because despite the overall tightening of bank credit, some of the loans extended to non-housing borrowers could be drawn away to be invested in housing as long as real property speculation picks up speed. Another problem is that as discussed below, a tighter macro-prudential policy runs into conflict with the conduct of monetary policy, which remains neutral, as it exerts contractionary effects on aggregate demand for goods and services.

Macro-prudential and Monetary Policy: Are They Independent?

A growing number of countries, both advanced and emerging, have taken to using macro-prudential tools in their efforts to stabilize their financial systems, but because of its short history, not much is known about its effectiveness in controlling systemic risk over and at a point in time and in a cross-sectional dimension in emerging economies.

Experiences of these countries suggest that faced with growing systemic risk, both monetary and supervisory authorities work well

in unison to forestall a financial crisis, when both consumer and asset prices are rising or falling together. In this case, the stance of the two policies would be the same and there are no spillover problems. When the build-up of inflationary pressure is accompanied by asset price bubbles, both policies will be tightened, for example, the policy rate is raised while the loan-loss provisioning will be increased, and they will reinforce each other. However, when the two prices move in opposite directions, a serious problem of working at cross-purposes arises.

Citing the literature on the target-tool assignment, Yellen (2010) argues that 'it is perfectly possible to attain good outcomes even if monetary policy and macroprudential policy are carried out separately and independently, and the goals of each are pursued using entirely separate tool kits'. Yellen claims that satisfactory results can be attained without policy coordination, even though fully optimal policy generally calls for coordination when spillovers occur, because situations may arise in which the central bank, in its conduct of monetary policy, might not be able to fully offset the macro-economic effects of macro-prudential interventions.¹⁰ In this section, it is argued that largely because many of the tools of macro-prudential policy work through the channels of monetary policy, the independence of macro-prudential policy as a macro-economic policy instrument is not warranted.

To examine further this lack of independence, consider again a situation in which consumer prices are not expected to rise beyond a target range, but a surge in housing prices threatens a bubble. Under these circumstances, the central bank could increase the policy rate to suppress unwarranted high expectations of capital gains, but would be reluctant to do so, unless the speculation has the danger of increasing inflationary pressure, whereas the regulatory authority would be called into action.¹¹ Suppose they lower the capping of the LTV and DTI together to apply a squeeze on overall bank credit supply.

This tighter macro-prudential policy is likely to move banks to

raise interest rates on their loans. It will also drive many of their loan customers out of the bank loan market and into money and capital markets for direct financing. This increase in the debt and equity financing will then increase market interest rates. If this happens, higher interest rates may dampen the aggregate demand for goods and services (with a possible exception of construction investment) as many borrowers without access to the capital market will be rationed out of the bank loan market, while it has limited effects on suppressing housing market speculation. The tighter stance of macro-prudential policy may therefore widen the output gap depending on the extent to which bank loans are shifted to housing finance. Macro-prudential measures may strengthen the financial system but do not necessarily help enhance financial stability. It follows then that if the policy rate is a poor tool to deal with financial market instability, so are macro-prudential tools for moderating financial cycles.

The preceding discussion raises an important question as to whether the division of labour in policy management in which the central bank follows an interest rate rule in conducting monetary policy for price stability, while the regulatory authorities are engaged in quantitative control in managing macro-prudential policy for financial stability is a viable institutional arrangement.

This question arises because most of the macro-prudential instruments leaning against financial cycles work through changes in the availability of sectoral and aggregate credit and in this respect they are similar to reserve requirements. That is, macro-prudential tools operate through effects on bank lending; changes in bank loans cause investment and consumer spending to change. Since this bank lending channel is one of many channels of monetary policy, it follows that in emerging economies the banking system dominates financial intermediation. As far as the channel of transmission is concerned, macro-prudential policy geared to controlling pro-cyclicality in bank lending and monetary policy targeted for price stability are one and the same, although they have different objectives.

Korea's Experience with Macro-prudential Policy: 2001–11

During the 1997–98 financial crisis when interest rates were skyrocketing and bank lending evaporated, real properties markets had taken a severe beating with a collapse of their prices. However, it did not take long for these markets to thrive again. Beginning in 2002, Korea was gripped again by a haunting memory for the boom–bust cycles in real estate prices – that had plagued the economy periodically throughout the pre-crisis period – and there was a steep rise in prices of housing.¹² One of the main causes of this resurgence was the speedy recovery of the economy with a return of stability in the financial system, but easy monetary policy with bank lending deregulation was largely responsible for inflaming the housing market boom.

Korea suffered from the global information technology (IT) bubble burst in 2001 with a dip in the growth rate. This setback in growth had led the bank of Korea to cut the policy rate to 4 per cent on September 2001 from a high of 5.25 a year earlier and kept it between 4.25 per cent and 3.25 per cent during the 2002 and 2005. The expansionary monetary policy then combined with the deregulation of mortgage lending at banks and non-bank financial institutions in the wake of the 1997–98 to rekindle real asset speculation.

For more than a decade thereafter, Korea's fiscal and financial regulatory authorities have battled for bringing real asset speculation under control by implementing various financial regulatory and tax policy measures. In contrast, however, the Bank of Korea has largely remained detached from the housing market boom by keeping an easy stance of monetary policy. As a result, the financial regulatory authority took the brunt of the responsibility of stabilizing real estate markets.¹³ The financial supervisory service (FSS), the watchdog of financial institutions and markets, has employed macro-prudential tools to smoothen out fluctuations in the prices of residential and commercial housing and land by controlling pro-cyclicality in mortgage lending. Although the available evidence is rather sketchy, it appears that these regulatory measures have not inspired much confidence in controlling real asset speculation.¹⁴

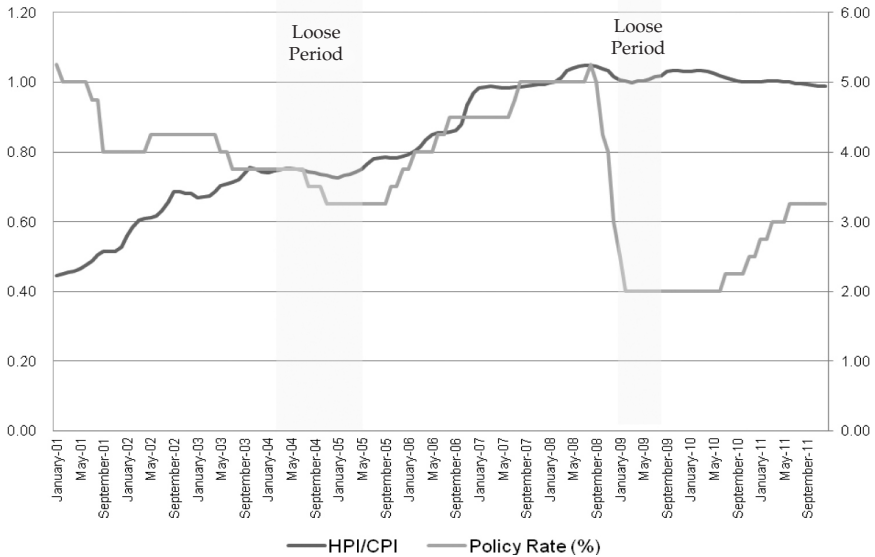


Figure 3.1: Changes in the Real House Price Index (HPI/CPI) and the Policy Rate

Source: Bank of Korea and Kookmin Bank

Note: HPI: Index for Seoul apartment prices

CPI: Consumer Price Index

As shown in Figure 3.1, over a 6-year period beginning on January 2001, the real house price index (HPI), the nominal house price index divided by CPI, more than doubled.¹⁵ The housing boom ended early in 2007 to be followed by a persistent slump. Understandably, throughout the period, the FSS has directed much of its effort to remedying susceptibility to speculation and improving resilience of the housing market. To this end, it has selected to impose macro-prudential restrictions on twelve occasions.¹⁶

Concerned about an incipient housing boom threatening an implosion of housing prices, the FSS introduced the LTV capping with a ceiling of 60 per cent in 2002 to curb mortgage lending. Since then it has adjusted the ratio eight times. On six occasions, the FSS has tightened it to squelch a housing market boom and loosened in 2004 and 2009 to stimulate housing demand. On August 2005, the regulatory authority fortified its arsenal of macro-prudential tools by

including the DTI regulation, which since then has been tightened five times and loosened up twice.

The boom in real asset markets, in particular housing, has been concentrated in many districts of the Seoul metropolitan area, while keeping most other regions uninfected. As a result, the FSS has concentrated on the Seoul metropolitan area as the target for its macro-prudential policy. As shown in Tables 3.1 and 3.2 in the Appendix, the FSS first lowered the LTV cap to 50 per cent on June 2003 for mortgage loans with maturity less than three years extended by banks and insurance firms in the Seoul metropolitan districts infected by speculation. The LTV control turned out to be less than effective, because of the leakages; banks were able and, in fact, started lending for housing finance with maturity longer than three years to avoid the restriction and non-bank financial institutions were not subject to it. Six months later in October, to plug these leakages, the FSS extended and tightened the LTV regulation to cover mortgage loans with ten years or less maturity by lowering the LTV cap to 40 per cent for apartment purchases.¹⁷

After the LTV tightening, the rise of housing prices had begun decelerating, but it was not clear whether it was the right time to relax macro-prudential policy. Unsure about whether the market lull could last, the FSS took a cautious step of relaxation by lifting up the LTV ratio to 70 per cent for mortgage loans with maturity longer than ten years on March 2004. However, within less than a year, housing prices reversed their downward trend to soar again. This resurgence prompted the FSS to cut the LTV cap on those mortgage loans with maturity longer than ten years for the purchase of an apartment valued at more than 600 million won (or approximately 600 thousand US dollars) in the speculative zones on June 2005. On November 2006, this restriction became more extensive to include non-bank financial institutions at a higher ceiling of 50 per cent to slowdown their mortgage lending.

After the Lehman Brothers' collapse, which triggered a liquidity crisis, a deeper recession and contraction of housing demand, Korea's policymakers also realized the need to relieve household borrowers of the burden of servicing their mortgage debt. This debt relief led the FSS to remove most of the speculative areas from its list of control in

November 2008. With the recovery from the liquidity crisis gaining speed in the early months of 2009, however, banks were increasing their mortgage lending and housing prices started rising again. In response, the FSS lowered the LTV ratio to 50 per cent for loans at banks for financing apartments worth more than 600 million won in the metropolitan area on July 2009. Three months later, this regulation applied to all financial institutions.

To complement the LTV regulation, between August 2005 and August 2007, the FSS lowered the DTI ratios five times at banks and other non-bank financial institutions. At its inception in 2005, a relatively small segment of riskier borrowers buying apartments, those who were single and under the age of 30 or if married, those whose spouses had debt, were subject to the ceiling of 40 per cent in several districts of the Seoul metropolitan area prone to speculation. Less than a year later, on March 26, the coverage of the restriction was broadened to include the borrowings for the purchases of smaller apartment units priced at 600 million won and more. A year later, apartment units, worth 600 million won or less, were also subjected to this regulation with the ratios set between 40 to 60 per cent.

As in the case of the LTV, the FSS removed most areas off its list of speculative zones on November 2008. The relaxation did not last long, however. On September 2009, the FSS saw the need to tighten the DTI regulation, only to loosen up again less than a year later when the housing market showed signs of contraction.

Observing the raw data on housing price developments since 2001, one may come to the conclusion that macro-prudential policy of adjusting the LTV and DTI tools has been effective in taming the real estate market boom, but failed to prevent its stagnation. This is also the conclusion reached by Igan and Kang (2011). For a study on the effectiveness of macro-prudential measures, the authors estimate an equation where a number of housing market variables are regressed against a vector of control variables and a dummy which takes on the value of 1 in the 6 months following the implementation of the LTV and DTI changes.

The results of this estimation show that the rates of increase in housing prices drop significantly for the 6 months following the tightening of the LTV. This deceleration is largely driven by developments in the metropolitan areas, most of which were designated as the speculative zones. Surprisingly, however, the results of the DTI tightening, which is known to be a more powerful tool, are not as robust as those of the LTV.

The authors also find that the rate of increase in the number of housing transactions fall off significantly during the 6 months after the LTV and DTI ratios are lowered mostly in the metropolitan areas. They do not find, however, any effectiveness of these macro-prudential tools on reviving the sagging demand or negative association between the growth of household borrowing and tightening of the two ratios.

In their study, Igan and Kang (2011) do not examine the effectiveness of changes in the two macro-prudential tools 6 months after the policy implementation is announced. Another recent study by Kang (2011) finds that it tends to disappear. The estimation results of Igan and Kang are less convincing than otherwise as they do not discuss some of the structural characteristics of Korea's housing market and limitations of the LTV regulation that could affect their results. One problem with the empirical examinations such as the one conducted by Igan and Kang is the difficulty of isolating the effects of the LTV regulation when it is implemented with other policies like monetary policy, tax and other administrative measures. Kim *et al.* (2010), for instance, lists 29 housing policies introduced during the Roh Moo Hyun administration (2003–07), which ranged from housing acquisition and registration tax to new town construction. Obviously, not all these variables can be controlled properly in a simple regression analysis.

On closer inspection, it is clear that despite the implementation of these macro-prudential measures, housing speculation did not subside until January 2007. During the 2005–07 period, it became clear that stronger doses of anti-speculation measures were needed and the stronger measures implemented included direct controls on housing transactions such as the requirement for registration of and imposition

of transfer and transaction taxes on trading in properties. In retrospect, it is questionable whether the real estate speculation could have been brought under control, if the government had refrained from resorting to the tax and other direct control measures.¹⁸

The LTV and DTI regulations for mortgage lending are managed in a highly complex system of supervision where different ratios are applied to different financial institutions and speculative areas.¹⁹ This complicated system has left a large room for loan leakages and loopholes for evasion. As noted earlier, housing speculators could easily divert their non-mortgage loan proceeds or cash in their holdings of other assets to finance their housing investments. They could choose to move to other areas that are not subject to the mortgage loan regulations to buy individual houses or apartments as long as they believe the prices of these real properties would continue to go up.

When housing prices are rising and expected to rise continuously, the tightening of the LTV regulation has a limited effect on moderating the growth of mortgage loans as banks and other non-bank financial institutions would lend more as the value of the housing collateral offered for mortgage loans also increases.

Korea's experience also suggests that the supervisory authority has consistently been reactive rather than preemptive in managing macro-prudential policy, lowering or raising the ceilings of the LTV and DTI every time it sees noticeable changes in housing prices since 2002. This reactive response may help subdue the pro-cyclicality in mortgage lending, which is shown to expand 6 months after the surge in housing prices, but it has allowed market participants to forecast with a fair degree of accuracy when and how the FSS would respond to changes in housing market developments.²⁰

Knowing from the past episodes that the boom could be persistent once it starts, market participants would rush to borrow as much as they could to beat the regulatory restrictions that may become more stringent as time passes in a boom period. In fact, they would take the restrictions as a signal for a housing market boom on the horizon that is likely to last for some time to come once realized. In the opposite case, where the housing market is down with falling prices, they would

stop borrowing. In fact, they would leave the market even before the regulatory authority reverses its macro-prudential policy when they believe that the boom has reached a peak. This pattern of behaviour on the part of the market participants may have increased the volatility of housing prices and frustrated the regulators in their efforts to anchor expectations on future housing prices.

In general, the effectiveness of macro-prudential tools may vary depending on the circumstances in which they are implemented. In the preceding section, it is argued that the conflict between monetary and macro-prudential policies is likely to be more severe, if rising consumer prices are accompanied by stagnation in the housing market as shown by the recent experience in Korea where monetary and macro-prudential policies took divergent paths.

In August 2010, the central bank raised the policy rate to be on guard against the signs of growing inflationary pressure, while the FSS went on to lift up the DTI ratio on specific mortgage loans to revive the weak demand for housing. The relaxation did little in the way of eliciting any positive housing market response, but the regulatory service could not tighten it any further because of a massive increase in household indebtedness, which has emerged as an element of systemic risk.²¹ As shown in Figure 3.2, after three years of slow growth, the availability of household loans, the bulk of which consists of mortgage loans, has been rising since 2009, whereas housing prices recovered only slightly in 2011 after four consecutive years of slowdown against the background of rising consumer prices. This divergence has made it difficult to determine an appropriate combination of monetary and macro-prudential policy (See Figure 3.3).

In the meantime, household debt grew rapidly, rising to more than 155 per cent of disposable income at the end of 2010 from 125 per cent six years earlier. Between 2008 and 2010, mortgage loans accounted for 93 per cent of the increase in household debt. More than 90 per cent of these loans carried variable rates and 78.4 per cent of mortgage loans outstanding were overdue, current only in interest payments. Figure 3.4 shows that the bulk of mortgage loans at banks has been financed by short-term deposits and borrowing from wholesale

funding markets, creating a balance sheet maturity mismatch. Given this profile of systemic risk, it was clear that the regulatory authority could not relax mortgage loan restrictions, whereas the monetary authority had to maintain a tighter stance of monetary policy to keep the lid on inflationary expectations.

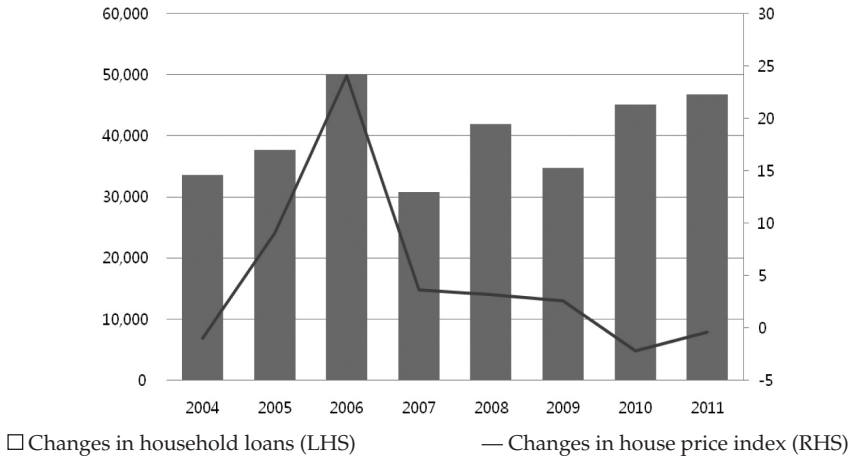


Figure 3.2: Changes in Housing Loans and Prices

Source: The Bank of Korea and Kookmin Bank

Note: Changes in household loans (billion Korean Won)

Changes in house price (Seoul apartment prices) index (year on year %)

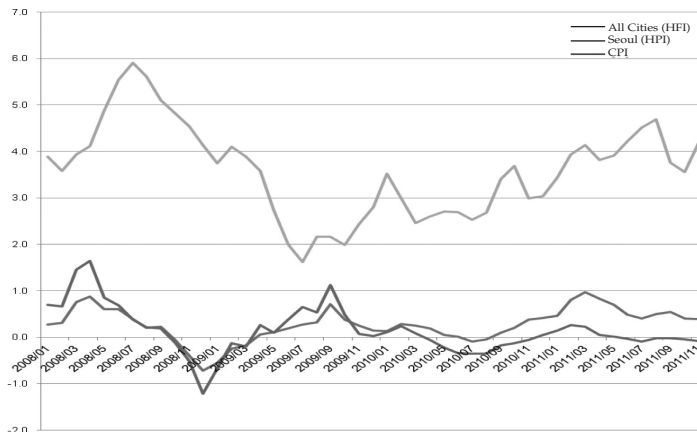


Figure 3.3: Changes in CPI and Housing Prices

Source: Bank of Korea (ECOS) and Kookmin Bank

Note: HPI is an Apartment Price Index

Unit: Per cent

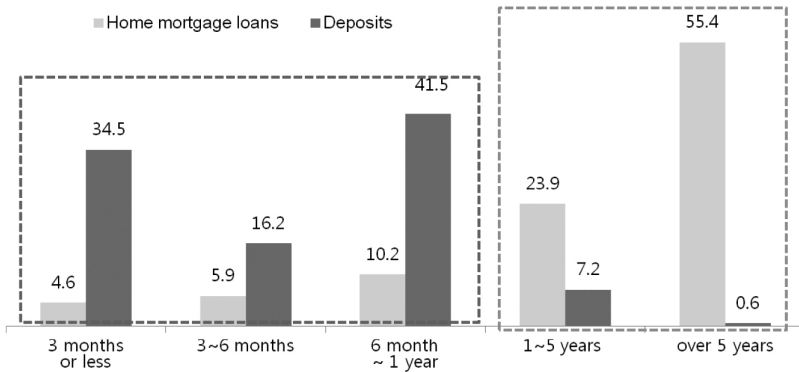


Figure 3.4: Shares of Mortgage Loans and Deposits by Maturity (%)

Source: Bank of Korea

Macro-prudential tools such as the LTV and DTI are rather inflexible instruments that cannot be fine tuned frequently to alter price expectations in real property markets. Fungibility of money makes their effectiveness at best ambiguous. Macro-prudential policy for controlling the quantity of aggregate credit needs to be coordinated with the conduct of monetary policy, but, given the different objectives and approaches, coordination between the monetary and regulatory authorities would be difficult to institutionalize.²²

For effective management of macro-prudential policy, the regulatory authorities, FSC and FSS, should be able to detect signs of real asset speculation well before they get out of control and to identify the turning points in cyclical developments. Equipping the FSS, for example, with macroeconomic forecasting would mean duplication of some of the functions of the central bank. This possibility, which could result in competing macroeconomic forecasts, underscores further the need to construct a mechanism of coordination between the two institutions, which the following section turns to.

Making Operational a Macro-prudential Framework for Financial Supervision

Macro-prudential Framework

In addressing systemic risk, the financial supervisory authorities, FSC and FSS, are responsible for providing information on the health

and efficiency of financial institutions and developments in financial markets pertinent to the assessment of financial stability, including the monitoring of various financial indicators, interpretation of scenario analyses and stress testing for both individual financial institutions and banking, and other financial industries. While this responsibility of supplying information and data is of crucial importance, the major task of the supervisory authority is to construct and manage a macro-prudential policy regime. Like in any other policy, this regime is structured around the goal, intermediate targets and tools of financial supervision.

The Objectives and Modality: Broadly, the goal of the macro-prudential approach to financial supervision is to sustain overall stability of the financial system in cooperation with other policy authorities. Given this objective, on part of the financial regulators, it would be instructive to identify some of the most likely sources from which financial distress originates. In emerging economies, as noted earlier, one of the most prevalent sources is speculation in asset markets, particularly in those markets for land, housing and commercial real estate, which often lead to the boom–bust cycle of their prices.²³

Other sources are likely to be speculative capital outflows and inflows, an unsustainable current account deficit and a high degree of volatility in the foreign exchange rate. Of these potential sources of financial instability, it appears that the supervisory authority has comparative advantage in controlling speculation in and stabilizing prices of real and financial assets as it has detailed information on and influence over the asset–liability management of banks and other financial institutions.

In stabilizing financial markets, the financial supervisors will find it necessary to analyse and monitor a large number of financial stability indicators such as those identified by the global financial stability report by the IMF. In many cases, this stability or macro-prudential analysis is not backed by quantitative analyses using a coherent general equilibrium model that defines and quantifies financial fragility. As such, they are descriptive and lack the diagnosis and forecasting of

financial stability; they are unable to indicate whether financial distress is in the making *ex ante* and explain the consequences of interactions of financial variables, which are mostly endogenous.

The macro-prudential analysis needs to be supported by general equilibrium models of systemic stability that can analyse and quantify aggregate financial stability (Goodhart, 2004).²⁴ Despite its potential, the reliability and usefulness of the general equilibrium approach is not proven in emerging economies. Other less sophisticated and partial equilibrium approaches to defining and measuring financial distress may be more useful to the emerging economies. For example, Borio and Lowe (2004) propose a scheme in which the probability of financial distress is evaluated in terms of a small set of variables that include the ratio of private credit to GDP, real asset prices and investment. They show that over a three-year horizon, close to 60 per cent of the crises are predicted in a sample of 34 industrial and emerging economies over the 1960–99 period during which there were 38 crises. In a subsequent paper (2004), they find a similar pattern in emerging economies when an over-valued exchange rate is included as an additional variable.²⁵

Intermediate Targets: Like the central bank's strategy of using operational and intermediate targets, the financial supervisory authority engaged in the macro-prudential policy needs to choose and aim at a set of variables that lie between its tools and the goal of stabilizing financial markets. The strategy to work with the intermediate target is desirable for two reasons. One is the difficulty of assessing and forecasting impending financial market instability. The difficulty is often compounded by the fact that the regulatory authority is not likely to be confident about its ability to influence the goal directly. Another reason is that whatever operational mechanism is instituted for macro-prudential policy, it is not likely to be managed on a day-to-day basis, but to be activated only when threats to financial stability become visible. By then it may be too late to deflect the threats. By installing a system of monitoring and analysing a set of intermediate targets, which may also serve as early warning indicators, the financial

supervisory institutions may have a better chance of detecting the signs of impending financial distress early on.

The criteria for choosing the intermediate targets are rather straightforward – they should be measurable, they should have predictable effects on financial stability and the supervisory authority should command a certain degree of control over the variables. Which variables would then qualify as intermediate targets? It is neither possible nor practical to consider all those indicators identified by the IMF's global financial stability report. A more realistic strategy would be to choose a manageable number of indicators that send clear signals of an impending asset market boom. In this regard, experiences with past financial crises would be helpful in identifying promising candidates. They are likely to vary from country to country, but some of the potential variables include the volume of lending, sectoral allocation of loans, risk spreads and capital provisions at banks and other financial institutions.

Management of Macro-prudential Supervision: In conducting macro-prudential policy, it would be instructive to think of it as a two-stage process of policy implementation. The first stage concentrates on an assessment of asset market stability. If potential threats to asset market stability are detected, financial regulators may respond to the growing imbalances by tightening micro-prudential tools at their disposal.²⁶ At this first stage, the macro-prudential response would be tailored to treat all financial institutions the same, as if there were 'n' number of identical financial institutions.

At the second stage of the policy response, micro-prudential policy would dominate, which consists of (i) monitoring the extent to which financial institutions adjust their asset and liability management in response to the tightening of prudential controls; and (ii) enforcing these controls if they do not adapt to the change.

In executing prudential controls, micro-prudential policy should take into consideration that different financial institutions including banks behave in different ways and are heterogeneous. This means that the level of risk financial institutions are exposed to is likely to

be different and idiosyncratic across institutions. Therefore, financial regulatory institutions may have to exercise considerable discretion in differentiating between financial institutions on the basis of their relative importance.

For example, macro-prudential operations have to weigh up the knock-on effect of financial distress (Crockett, 2000 and White, 2004). Banks as the suppliers of liquidity to the system and large and more complex institutions, such as those engaged in universal banking, should be subject to scrutiny in monitoring their imprudent behaviour than smaller financial firms whose failure may not necessarily pose serious systemic risks.

On implementing prudential tools, questions have been raised as to the extent to which the supervisory authorities should be allowed to exercise discretion as opposed to relying on a set of rules. In view of the fact that the supervisory authority will have difficulty in diagnosing the health and soundness of the financial system independently or in cooperation with other authorities and that the effect of the macro-prudential supervision on the behaviour of financial institutions and markets is uncertain, relying on discretion could be counter-productive. There is also the danger that the supervisory authority loses its credibility and influence on financial market participants if they cry wolf too often.²⁷

Need for Tripartite Policy Coordination

An effective policy response to macro-prudential concerns of mitigating financial systemic imbalances with their attendant heavy costs in terms of output and employment may require a broader framework for macroeconomic policy, which encompasses not only the use of macro-prudential instruments but also monetary and fiscal policies. Only such a broad policy regime can provide critical information needed for financial stability about the distribution of risks and various systemic vulnerabilities stemming from the transfer of one type of risk to another through the interplay among market participants (White, 2004). The framework may also have advantages as it could facilitate policy coordination and institutionalize an integrated role of the central bank, the supervisory agency and the fiscal authority.

In this broader framework, all policy authorities – the central bank, the supervisory institution and the central government fiscal authority with a clear division of labour – are jointly responsible for steering the economy clear of financial disruptions. Before the supervisory function was separated out the central banks were engaged in some type of macro-prudential supervision. Now that many central banks do not have the authority of supervising individual financial institutions, the responsibilities for financial stability have to be shared among the three institutions in terms of policy tools at their disposal. In this regard, it may be desirable to create a tripartite committee consisting of all the three policy authorities for monitoring and analysing various financial stability indicators and making decisions on the activation of policy response to an impending financial crisis.

Concluding Remarks

Macro-prudential orientation of financial supervision and regulation is not necessarily a new idea. Most central banks with supervisory oversight have been and will continue to be engaged in some type of macro-prudential supervision. In their supervisory role, they would rely on many of the micro-prudential tools as a means of controlling pro-cyclicality in lending and risk management at banks and other financial institutions.

Two relatively recent developments have garnered growing attention to macro-prudential orientation of financial supervision both in domestic and international policy communities. One has been the realization that the best defense against financial instability begins with strengthening the foundations of the domestic financial system.

The other has been the creation of an independent supervisory institution in a number of countries. These supervisory institutions are still bound by tradition of giving priority to ensuring safety of individual financial institutions to protect consumers-depositors and other financial investors. At the same time, many central banks have chosen inflation targeting as the framework for their conduct of monetary policy. To be sure, central banks have the mandate to maintain overall financial stability as well. Nevertheless, the transfer

of supervisory oversight and the focus of the central bank on inflation targeting appear to have created a vacuum of macro-prudential supervision as a constituent part of an overall macroeconomic policy framework for financial stability. This is a highly undesirable and unsustainable state of policy management and will have to be rectified. This chapter recommends the construction of an overall framework for macro-prudential policy to be managed jointly by monetary, fiscal and supervisory authorities.

As a newly established institution, the independent supervisory agency may not have had the time to develop either the culture or the expertise needed to incorporate macro-prudential controls in its supervisory operations. This internal constraint has been compounded by the additional burden of conducting macro-prudential controls in the absence of a reliable macro-economic framework for macro-prudential policy that the authority can make use of in evaluating emergence of financial distress and charting appropriate policy responses. Despite a growing literature, the ongoing debate, it appears, has not settled on the scope and effectiveness of macro-prudential policy. What is, therefore, needed at this stage of the debate is further research on the quantification and better assessment of systemic financial risk and the scope and effectiveness of prudential controls of the supervisory agencies.

Appendix 3.1

Table 3.1.1: Timeline of LTV Regulations

| Date | Specificaion | Range of Application | Direction |
|------------|--|-------------------------------|-----------|
| Sept. 2002 | Introduced the LTV ceiling as 60 per cent. | Banks and Insurance Companies | Inception |
| June 2003 | Reduced the LTV from 60 to 50 per cent for loans of 3 years and less maturity to buy houses in the speculative zones. | Banks and Insurance Companies | Tighten |
| Oct. 2003 | Reduced the LTV from 50 to 40 per cent for loans of 10 years and less maturity to buy houses in the speculative zones. | Banks and Insurance Companies | Tighten |

| Date | Specificaion | Range of Application | Direction |
|------------|--|--|-----------|
| March 2004 | Raised the LTV from 60 to 70 per cent for loans of 10 years or more maturity and less than one year of interest only payment. | All Financial Institutions | Loosen |
| June 2005 | Reduced the LTV from 60 to 40 per cent for loans of 10 years and less maturity to buy houses worth 600 million won and more in the speculative zones. | Banks and Insurance Companies | Tighten |
| Nov. 2006 | Set the LTV ceiling as 50 per cent for loans of 10 years and less maturity to buy houses worth 600 million won and more in the speculative zones and originated by nonbank financial institutions such as mutual credits, mutual savings banks, and credit-specialized financial institutions. | Extended to Nonbank Financial Institutions | Tighten |
| Nov. 2008 | Removed all areas except the three Gangnam districts off the list of speculative zones. | All Financial Institutions | Loosen |
| July 2009 | Reduced the LTV from 60 to 50 per cent for loans to buy houses worth 600 million won and more in the metropolitan area. | Banks | Tighten |
| Oct. 2009 | Expanded the LTV regulations to all financial institutions for the metropolitan area. | Nonbank Financial Institutions | Tighten |

Table 3.1.2: Timeline of DTI Regulation

| Date | Specificaion | Range of Application | Direction |
|-----------|---|----------------------------|-----------|
| Aug. 2005 | Introduced the DTI ceiling as 40 per cent for loans used to buy houses in the speculative zones only if the borrower is single and under the age of 30 or if the borrower is married and the spouse has debt. | All Financial institutions | Inception |
| Mar. 2006 | Set the DTI ceiling as 40 per cent for loans to buy houses worth 600 million won and more in the speculative zones. | All Financial Institutions | Tighten |
| Nov. 2006 | Extended the range of application of DTI regulation to the overheated speculation zones in the metropolitan area. | All Financial Institutions | Tighten |
| Feb. 2007 | Set the DTI ceiling as 40-60 per cent for loans to buy houses worth 600 million won and less. | Banks | Tighten |

| | | | |
|------------|--|-------------------------------------|---------|
| Aug. 2007 | Set the DTI ceiling as 40-70 per cent for loans originated by nonbank financial institutions such as insurance companies, mutual savings banks, and credit-specialized financial institutions. | Extended to Nonbanking Institutions | Tighten |
| Nov. 2008 | Removed all areas except the three Gangnam districts off the list of speculative zones (so, the DTI regulation does not apply to the metropolitan areas). | All Financial Institutions | Loosen |
| Sept. 2009 | Extended the range of application of DTI regulation to the non-speculative zones in Seoul and the metropolitan area (Gangnam Three 40 per cent, non-speculative zones in Seoul 50 per cent, the other metropolitan areas 60 per cent). | Banks | Tighten |
| Aug. 2010 | Exempted the loans to buy houses in the non-speculative zones of the metropolitan area if the debtor owns less than two houses (set to expire by end-March 2011). | All Financial Institutions | Loosen |

Endnotes

- ¹ See Galati and Moessner (2011) for a literature survey.
- ² Goodhart cites the Japanese experience in the 1980s as an example in which banks were strong individually, but they were systemically weak in the face of the bursting of the real estate bubble.
- ³ See Crockett, 2000; Borio, 2003 and White, 2004 on the pro-cyclicality of lending.
- ⁴ To put it differently, macro-prudential policy is designed to lean against the wind when systemic risk is building up and to stem the risks originating in interconnections and spillovers in the financial system (CGFS, 2010 and Hannoun, 2010). See also Crockett (2000), Borio (2003) and White (2004) on the pro-cyclicality of lending.
- ⁵ CGFS (2010) and Hannoun (2010) provide a list of these instruments categorized by the disruptions to the financial system they constrain.
- ⁶ These instruments can be complemented by the dynamic provisioning, but with caution. This is because the dynamic provisioning scheme may have an inherent bias against small and medium-sized firms and households that have increasingly accounted for a large share of customers at banks. Large firms have access to international as well as domestic capital markets for the financing of their investment. Denied credit at banks, they could issue commercial paper, bonds and equities to raise funds they need.

These financing alternatives are often not available to small-and medium-sized firms. During an economic boom, the dynamic provisioning may discriminate against small-and medium-sized firms, which are likely to be perceived as high-risk clients.

- ⁷ It should be noted that the preceding categorization is based on broad correspondence between the instruments and the two objectives of macro-prudential policy as some of these instruments such as the LTV ratio, which can improve the resilience of the financial system, but also serve as an automatic stabilizer for the financial system (CGFS, 2010).
- ⁸ This section draws on Park (2010).
- ⁹ A housing market boom often coincides with land speculation. Business borrowers may decide to use a fixed investment loan to build a plant on a larger site of land than otherwise.
- ¹⁰ Yellen (2010) points out that higher supervisory standards for capital following the real estate-related loan losses of the early 1990s may have slowed down the economy's recovery from the recession. More stringent bank capital and liquidity requirements to stem systemic risk, when many economies suffer from high unemployment, may delay economic recovery unless implemented in gradual manner over time. The new Basel III agreement recognizes the desirability of a phase-in period for these standards. The implementation of tighter standards over a multi-year period could mitigate the concern that the macro-prudential policies designed to control systemic risk will unduly restrict the availability of credit.
- ¹¹ The fiscal authorities may raise the property tax rate and impose additional taxes on the transactions in and transfer of properties, but these types of taxation may not be desirable as they distort property markets to impair their efficiency.
- ¹² Ro (2007), by comparing the sales price index with its rental price index from 1999 to 2007 period, shows that the investment demand with its potential for capital gains dominated the consumption demand for housing in the Seoul metropolitan area. The rental-to-sales price ratio, which measures the degree of the weight of the consumption demand in the market value of a house or apartment unit, declined after October 2001 when the sales price sharply increased.
- ¹³ The financial supervisory authority consists of the two organizations, the Financial Services Commission (FSC) and Financial Supervisory Service (FSS). The FSC serves as a consolidated policymaking body for the supervision of the financial industry as a whole. The FSS was established on January 2, 1999, under the Act on the Establishment of Financial Supervisory Organizations by bringing together four supervisory bodies, Banking Supervisory Authority, Securities Supervisory Board, Insurance Supervisory Board and Non-bank Supervisory Authority, into a single supervisory organization. The primary function of the FSS is

examination and supervision of financial institutions, but it also conducts other oversight and enforcement functions as requested by the FSC and the Securities and Futures Commission. The posts of the FSC Chairman and the FSS Governor were separated on March 2008 for clear distinction between policymaking and execution of financial market supervision.

- ¹⁴ A 2010 survey by the BIS on the use of macro-prudential instruments in 33 countries shows that in most cases the objective was to enhance the resilience of the financial system rather than moderating financial cycles and that the evidence on the effectiveness of macro-prudential measures is not conclusive (CGFS, 2010).
- ¹⁵ The house price index used is based on prices of apartment units in the Seoul metropolitan area.
- ¹⁶ For the details of changes in the mortgage lending regulations, see Igan and Kang (2011) and Chang (2010).
- ¹⁷ In Korea, there is a liquid market for apartments, which are standardized in terms of size and are actively traded. In particular, smaller ones are easily marketable, making them tradable investment assets and good substitutes for financial assets.
- ¹⁸ The control variables introduced in Igan and Kang's study do not include tax regulations and administrative controls.
- ¹⁹ It was unnecessary to impose the lending regulations nationwide because speculation did not permeate all housing markets that were disparate and regionally segmented.
- ²⁰ On this lag see Kang (2011).
- ²¹ During first seven months of 2010, consumer prices rose by about 1 per cent, whereas housing prices in some parts of the Seoul metropolitan area began to fall beginning in the second quarter of 2010.
- ²² The regulatory authorities may have not developed the expertise or culture of macro-prudential policy, while the central bank cannot exercise supervisory control at the level of individual institutions. These institutional constraints could hamper coordination between the two policy authorities.
- ²³ In the run-up to a financial crisis or during the upswing phase of the business cycle, financial imbalances are often manifested in sharp increases in the prices of real and financial assets, regardless of whether the causes of the imbalances are of domestic or foreign origin.
- ²⁴ Goodhart (2004 and 2006) shows that a general equilibrium model based on a microeconomic foundation can be constructed to measure and predict fragility of the banking sector, not the overall financial system. This model includes incomplete financial markets, heterogeneous banks, heterogeneous bank customers, endogenous default and credit and deposit markets. An index of financial distress of the banking sector is defined in terms of the probability of default of the banking sector, which is chiefly

related to bank profitability and the bank repayment rate.

- ²⁵ The performance of the three variables is measured in terms of the noise-to-signal ratio. In order to capture the buildup of financial distress, the authors use the deviations of the three variables from the levels of the time of assessment.
- ²⁶ The central bank will also be alerted to the disruption and called into action. On its part, the bank may raise its policy rate to discourage speculation and transaction.
- ²⁷ Given these circumstances and risks together with the expediency of the rules, one can make a strong case for a rule-based, rather than a discretionary, macro-prudential supervision. Goodhart (2004) is an advocate of linking not only provisioning but also the pricing of risks to the volume of the lending at banks. Borio (2002), however, argues that the rule-based supervision has its share of problems: it may not encourage financial institutions to improve their risk management, thereby exacerbating incentives to arbitrage it away, and it may not be consistent with promoting a better balance between market and policy-induced discipline.

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Reassessing the Impact of Finance on Growth

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Introduction

One of the principal conclusions of modern economics is that finance is good for growth. The idea that an economy needs intermediation to match borrowers and lenders, channelling resources to their most efficient uses, is fundamental to modern-day thinking. Ever since the pioneering work of Goldsmith (1969), McKinnon (1973) and Shaw (1973), people have been able to point to evidence supporting the view that financial development is good for growth. More recently, researchers were able to move beyond simple correlations and establish a convincing causal link running from finance to growth. While there have been dissenting views, today it is accepted that finance is not simply a by-product of the process of development, but an engine propelling growth.² This, in turn, was one of the key elements supporting arguments for financial deregulation. If finance is good for growth, shouldn't one be working to eliminate barriers to further financial development?

It is fair to say that recent experience has led both academics and policymakers to reconsider their prior conclusions. Is it true, regardless of the size and growth rate of the financial system? Or, like a person who eats too much, does a bloated financial system become a drag on the rest of the economy?

In this chapter, the authors address this question by examining the impact of size and growth of the financial system on productivity growth at the level of aggregate economies. Two very striking conclusions are presented here. First, as is the case with many things in life, with finance one can have too much of a good thing. That is, at low levels, a larger financial system goes hand in hand with higher productivity growth. But there comes a point, one that many advanced economies passed long ago, where more banking and more credit are associated with lower growth.

The second result comes from looking at the impact of growth in the financial system, measured as growth in either employment or value added, on real productivity growth. Here, one finds evidence that is unambiguous; faster growth in finance is bad for aggregate real growth. One interpretation of this finding is that financial booms are inherently bad for trend growth.

At first, these results may seem surprising. After all, a more developed financial system is supposed to reduce transaction costs, raising investment directly, as well as improving the distribution of capital and risk across the economy.³ These two channels, operating through the level and composition of investment, are the mechanisms by which financial development improves growth.⁴ But the financial industry competes for resources with rest of the economy. It requires not only physical capital, in the form of buildings, computers and the like, but highly skilled workers as well. Finance literally bids rocket scientists away from the satellite industry. The result is that people who might have become scientists, who in another age dreamt of curing cancer or flying to Mars, today dream of becoming hedge fund managers.⁵

There is an important sense in which this description of the consequences of a financial boom is no different from those of the dotcom boom of the 1990s, or the impact of any other boom tied to a more tangible output. Booming industries draw in resources at a phenomenal rate. It is only when they crash, after the bust, that one realizes the extent of the overinvestment that occurred. Too many companies were formed, with too much capital invested and too many

people employed. Importantly, after the fact, one can see that many of these resources should have gone elsewhere. Following the dotcom bust, innumerable computers were scrapped, office buildings vacated and highly trained people laid off.

The remainder of the chapter provides the empirical evidence for the conclusions. In the next section, the impact of financial system size on productivity growth in a sample of fifty advanced and emerging market economies over the past three decades is examined. To measure the size of the financial sector, both output measures like private credit to GDP as well as input measures like the financial sector's share in total employment (in this latter case, the analysis is restricted to advanced countries because of limited data availability) is considered. Considering the level of financial development, one finds that when private credit grows to the point where it exceeds GDP, it becomes a drag on productivity growth. Using employment measures, one finds that when the financial sector represents more than 3.5 per cent of total employment, further increases in size of the financial sector tend to be detrimental to growth.

Next, the impact of the growth rate of the financial system on aggregate productivity growth in a sample of advanced countries over the past three decades is examined. Again, the analysis is restricted to advanced economies due to data limitations. There it is found that, compared with a country where the financial sector's share in total employment is stable, a typical financial boom – employment growth of 1.6 per cent per year – reduces growth in aggregate GDP per worker by roughly one half of 1 percentage point.

The Inverted U-shaped Effect of Financial Development

One may begin by examining the relationship between the size of a country's financial system and its productivity growth to see whether there is a point where bigger is no longer better. In what follows, various measures of financial development, starting with the ratio of private credit to GDP are examined.

Private Credit and Growth

The analysis begins with a simple histogram constructed from a sample of fifty advanced and emerging countries over the period 1980–2009. Using 5-year non-overlapping GDP-per-worker growth and private credit to GDP, it is computed that the average growth conditional on the quartiles of the ratio of private credit to GDP. The resulting histogram, computed from a total of three hundred data points, shows that GDP-per-worker growth increases from the first to the third private credit to GDP quartile, before declining in the final quartile. That is, countries with the highest level of private credit to GDP have lower trend growth than the rest.

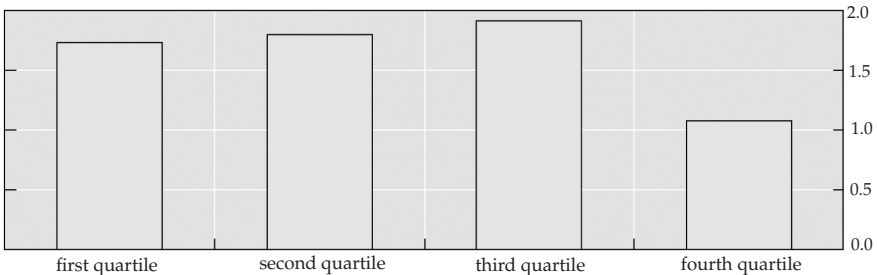


Figure 4.1: Average GDP-per-worker Growth by Private Credit to GDP Quartiles

Note: Each bar represents the 5-year average GDP-per-worker growth conditional on the 5-year average private credit to GDP ratio belonging to a specific quartile of the sample distribution. The sample covers 50 countries over the period 1980–2009. GDP-per-worker growth and private credit to GDP are averaged for non-overlapping periods over 5 years. For country sample and sources, see data appendix.

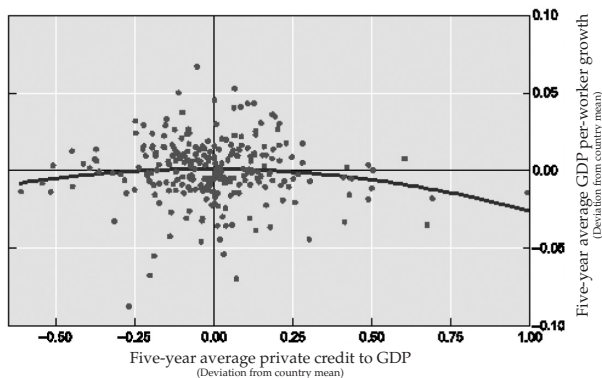


Figure 4.2: Private Credit to GDP Ratio and Growth

Note: Graphical representation of $\Delta y_{k,t+5,t} = \alpha + \beta_k + \gamma_0 (fd_{k,t,t+5}) + \gamma_1 (fd_{k,t,t+5})^2 - \delta y_{k,t} + \varepsilon_{k,t}$ over the period 1980–2009. For country sample and sources, see data appendix.

Of course, this histogram does not imply that private credit is bad for growth at high levels. Countries with high private credit to GDP are more developed economies, whose growth rates are lower for a variety of reasons. Convergence effects are the most obvious. To address this, deviations from country-specific means, and control for initial conditions are computed. The result, based on the sample of data, is in Figure 4.2. The relationship is clearly not monotonic. That is, at low levels of credit, more credit raises trend growth. But there comes a point where the additional lending and a bigger financial system become a drag on growth.

To get a more precise sense of this relationship and to test the hypothesis that the effects of finance on growth can go from good to bad, one can turn to a panel regression.⁶ The 5-year average growth in output per worker in a given country is regressed on the following variables – the level of financial development; the squared level of financial development (looking for the parabola in Figure 4.2) and a series of control variables known to influence aggregate growth.

To fix ideas and notation, this is written as:

$$\Delta y_{k,t+5,t} = \alpha + \beta_k + \gamma_0 (fd_{k,t+5,t}) + \gamma_1 (fd_{k,t+5,t})^2 + \gamma_2 X_{k,t+5,t} - \delta y_{k,t} + \varepsilon_{k,t} \quad (\text{Equation 4.1})$$

Where, $y_{k,t}$ is the log of output per worker in country k in year t ; $\Delta y_{k,t+5,t}$ is the average growth in output per worker in country k from time t to $t+5$; $fd_{k,t+5,t}$ is the average ratio of private credit to GDP in country k from time t to $t+5$, the measure of financial development; $X_{k,t+5,t}$ is a set of control variables averaged from time t to $t+5$, including working population growth, openness to trade measured by the ratio of imports and exports to GDP, the share of government consumption in GDP and CPI inflation; α is a constant and β_k is a vector of country dummies; and ε is the error term, which is allowed for heteroskedasticity. The hypothesis is that γ_0 will be positive and γ_1 negative.

In the first column of Table 4.1, the result is reported with no controls. Here one sees what one expects – the relationship is parabolic. Continuing across the columns of the table, the controls are added sequentially. The non-linearity is robust. Regardless of the exact specification, the coefficient of the level of financial development, γ_0 , is around 0.035 and that on the quadratic term, γ_1 , is always close to -0.018.⁷

One can use the estimated coefficients to compute an estimate of the peak of the inverted U – the vertical line in Figure 4.2. These are reported near the bottom of the table, together with 95 per cent interval estimates. The point estimates all roughly 100 per cent of GDP, a figure that is quite close to the threshold of 90 per cent computed in Cecchetti et al (2011).⁸

To see what these numbers mean, one can look at a few examples. Starting with New Zealand, in the first half of the 1990s, private credit was below 90 per cent of GDP. Credit then rose steadily, reaching nearly 150 per cent of GDP by the time of the crisis. The estimates in Table 4.1 suggest that this increase created a drag of nearly one half of 1 percentage point on trend productivity growth.

Thailand is another interesting case. In the run-up to the Asian crisis of 1997–98, the ratio of Thai private credit to GDP reached 150 per cent. More recently, this measure of financial sector size has fallen to roughly 95 per cent. This time, the result is a benefit of roughly one half of 1 percentage point in trend productivity growth.

Finally, take the example of the United States, where private credit grew to more than 200 per cent of GDP by the time of the financial crisis. Reducing this to a level closer to 100 per cent would, by estimates, yield a productivity growth gain of more than 150 basis points.

Table 4.1: GDP-per-worker Growth and Private Credit to GDP

| Dependent variable: 5-year average real GDP-per-worker growth | (1) | (2) | (3) | (4) | (5) | (6) |
|---|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| 5-year average private credit to GDP | 0.036*** (0.011) | 0.038*** (0.011) | 0.035*** (0.011) | 0.035*** (0.011) | 0.035*** (0.011) | 0.048** (0.021) |
| 5-year average private credit to GDP <i>squared</i> | -0.018*** (0.005) | -0.018*** (0.005) | -0.018*** (0.005) | -0.017*** (0.005) | -0.017*** (0.005) | -0.022*** (0.008) |
| Log of real GDP per worker | -0.742*** (0.211) | -1.020*** (0.210) | -1.110*** (0.208) | -1.110*** (0.207) | -1.160*** (0.204) | -6.220*** (1.200) |
| 5-year working population growth | | -0.478*** (0.162) | -0.480*** (0.160) | -0.471*** (0.163) | -0.501*** (0.152) | -0.685*** (0.162) |
| 5-year average openness to trade | | | 0.010*** (0.003) | 0.010*** (0.003) | 0.009*** (0.003) | 0.054*** (0.010) |
| 5-year average government consumption share in GDP | | | | 0.0106 (0.046) | 0.0107 (0.045) | -0.145 (0.331) |

| Dependent variable: 5-year average real GDP-per-worker growth | (1) | (2) | (3) | (4) | (5) | (6) |
|---|-------------|-------------|-------------|-------------|-------------------|------------------|
| 5-year average CPI inflation | | | | | 0.0378 (0.036) | 0.047 (0.037) |
| Turning point for the effect of private credit to GDP on real GDP-per-worker growth | 0.98 | 1.02 | 0.99 | 0.99 | 1.01 | 1.08 |
| 95% confidence interval | [0.97;1.00] | [1.01;1.03] | [0.98;1.01] | [0.98;1.01] | [0.99;1.02] | [1.06;1.11] |
| Observations | 270 | 270 | 270 | 270 | 270 | 270 |
| R-squared | 0.098 | 0.160 | 0.190 | 0.190 | 0.213 | 0.424 |

*Note: The dependent variable is the 5-year average real GDP-per-worker growth for 1980–2009 for each country, which yields six observations per country. 5-year averages for the independent variables are computed over the same period as the dependent variable. The log of real GDP per worker is the natural logarithm of real GDP per worker for the initial year of the period over which the averages are computed, divided by 100. All estimates include a non-reported constant. Column (6) includes country dummies. Robust standard errors are in parentheses. Significance at the 1/5/10 per cent level is indicated by ***/**/*.* The turning point for the effect of private credit to GDP on real GDP-per-worker growth is the level for private credit to GDP below (above) which an increase in private credit to GDP is estimated to raise (reduce) real GDP-per-worker growth. For country sample and sources, see data appendix.

One should be very clear that one does not in any way view these peak debt values as targets, and neither should any readers (or authorities). These are levels of debt that a country should only approach in extremis. And as discussed in more detail by Cecchetti *et al* (2011), under normal circumstances one would expect to see debt at much lower levels than these thresholds. Keeping debt well below 90 per cent of GDP provides the room needed to respond in the event of a severe shock. Otherwise, should a crisis arise, the additional accumulation of debt would result in a drag on growth that would make recovery even more difficult than it already is.⁹

Alternative Measures of Financial Development

In the previous section, financial development was measured using total credit extended to the private sector. In this section, the robustness of this result to the use of alternative measures of financial sector size is examined. One may start by looking at the consequences of using bank credit rather than total credit, and then move on to study the

relationship between growth and the share of employment accounted for by the financial sector.

Bank credit as a measure of financial development: Differences in financial system structure imply that credit can mean different things in different countries. And this difference could be the driving force behind the results. For example, the inverted U-shape could reflect compositional effects, with bank-based financial systems being one part of the parabola and market-based financial systems being the other. To examine this possibility, private credit is replaced with private credit by banks (relative to GDP) in Equation 4.1.

Table 4.2 presents the results of this exercise. Again, one can start with no controls in the first column and add controls sequentially moving to the right in the table. The results confirm both the parabolic relationship and its robustness. Furthermore, the point estimates themselves are very close to those in Table 4.1.

Looking at the peak of the parabola, it is estimated that for private credit extended by banks, the turning point is closer to 90 per cent of GDP – somewhat lower than for total credit. Many countries are close to or beyond this level, suggesting that more credit will not translate into higher trend growth. For example, in Portugal, private credit by banks was 160 per cent of GDP at the onset of the financial crisis. The corresponding figure for the UK was 180 per cent of GDP and even reached 200 per cent of GDP in Denmark. In contrast, a country like India, where bank credit is less than 50 per cent of GDP, can still reap significant benefits from further financial deepening in terms of increasing productivity growth.

Table 4.2: GDP-per-worker Growth and Private Credit by Banks to GDP

| Dependent variable: 5-year average real GDP- per-worker growth | (1) | (2) | (3) | (4) | (5) | (6) |
|--|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| 5-year average private credit by banks to GDP | 0.0369*** (0.0117) | 0.0373*** (0.0116) | 0.0336*** (0.0118) | 0.0334*** (0.0118) | 0.0325*** (0.0121) | 0.0477** (0.0208) |
| 5-year average private credit by banks to GDP <i>squared</i> | -0.0196*** (0.00520) | -0.0193*** (0.00522) | -0.0185*** (0.00521) | -0.0184*** (0.00519) | -0.0178*** (0.00543) | -0.0229*** (0.00836) |

| Dependent variable: 5-year average real GDP- per-worker growth | (1) | (2) | (3) | (4) | (5) | (6) |
|---|----------------------|----------------------|------------------------|------------------------|-------------------------|-----------------------|
| Log of real GDP per worker | -0.732*** (0.195) | -0.979*** (0.197) | -1.046*** (0.195) | -1.049*** (0.195) | -1.086*** (0.191) | -6.279*** (1.174) |
| 5-year working population growth | | -0.461*** (0.164) | -0.463*** (0.163) | -0.455*** (0.166) | -0.483*** (0.155) | -0.675*** (0.164) |
| 5-year average openness to trade | | | 0.0105*** (0.00295) | 0.0105*** (0.00297) | 0.00979*** (0.00296) | 0.0545*** (0.0108) |
| 5-year average government consumption share in GDP | | | | 0.00962 (0.0453) | 0.00977 (0.0445) | -0.114 (0.329) |
| 5-year average CPI inflation | | | | | 0.0364 (0.0368) | 0.0456 (0.0368) |
| Turning point for the effect of private credit to GDP on real GDP-per- worker growth | 0.94 | 0.96 | 0.91 | 0.91 | 0.92 | 1.04 |
| 95% confidence interval | [0.93;0.95] | [0.95;0.98] | [0.90;0.92] | [0.90;0.92] | [0.90;0.93] | [1.02;1.07] |
| Observations | 269 | 269 | 269 | 269 | 269 | 269 |
| R-squared | 0.103 | 0.161 | 0.194 | 0.194 | 0.215 | 0.426 |

*Note: The dependent variable is the 5-year average real GDP-per-worker growth for 1980–2009 for each country, which yields 6 observations per country. 5-year averages for the independent variables are computed over the same period as the dependent variable. The log of real GDP per worker is the natural logarithm of real GDP per worker for the initial year of the period over which the averages are computed, divided by 100. All estimates include a non-reported constant. Column (6) includes country dummies. Robust standard errors are in parentheses. Significance at the 1/5/10 per cent level is indicated by ***/**/*.* The turning point for the effect of private credit by banks to GDP on real GDP-per-worker growth is the level for private credit by banks to GDP below (above) while an increase in private credit to GDP is estimated to raise (reduce) real GDP-per-worker growth. For country sample and sources, see data appendix.

Financial sector employment as a measure of financial development:

The use of credit as a measure of financial development means that the focus is now on the output of the sector. An alternative gauge of financial sector size and financial development, one based on inputs, is the financial sector's share in the economy's total employment. Using a more limited sample drawn from 21 Organisation for Economic Co-operation and Development (OECD) economies over the period from 1980 to 2009, one may look at the relationship between the financial

sector's use of the economy's labour resources and aggregate growth. In addition to providing a different measure of financial development, the analysis using an input-based measure of financial development provides an important check that the inverted U-shaped effect on growth is not simply the result of using a sample which mixes advanced and emerging market economies.

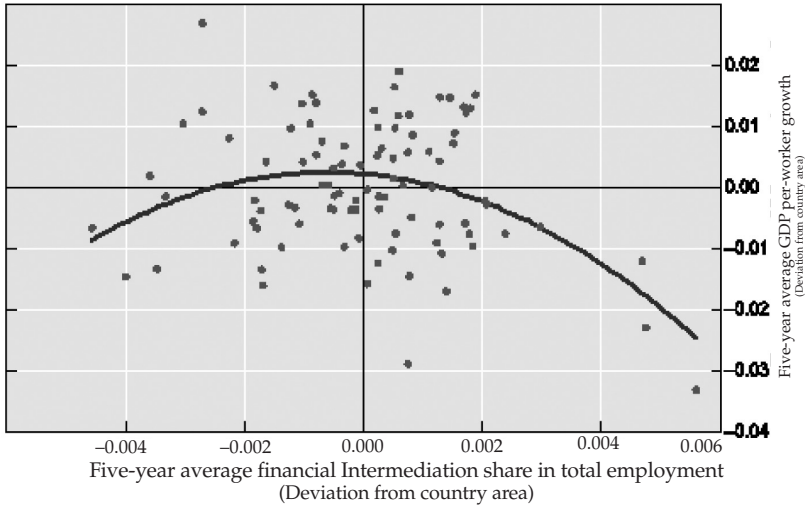


Figure 4.3: Financial Sector Share in Employment and Growth

Note: Graphical representation of $\Delta y_{k,t+5,t} = \alpha + \beta_k + \gamma_0(fs_{k,t,t+5}) + \gamma_1(fs_{k,t,t+5})^2 - \delta y_{k,t} + \varepsilon_{k,t}$ over the period 1980–2009. For country sample and sources, see data appendix.

The analysis starts with a scatter plot in Figure 4.3, which is analogous to Figure 4.2. The results confirm the previous results – the relationship between growth and the financial sector's share in employment is an inverted U. At low levels, an increase in the financial sector's share in total employment is actually associated with higher GDP-per-worker growth. But there is a threshold beyond which a larger financial sector becomes a drag on productivity growth.

Turning to the regression analysis, Equation 4.1 is estimated using the 5-year average financial sector share in total employment in country as a measure of financial development (*fd*). Again, on the left-hand side there is the 5-year average growth in output per worker in a given country. And on the right-hand side, there is the financial

sector's share in total employment, the financial sector's share in total employment *squared* and various controls.

Table 4.3 presents the results from this exercise. Here the expected result is reflected – the relationship is parabolic.¹⁰ Again, the result is robust to the addition of controls.

Table 4.3: GDP-per-worker Growth and Financial Sector Share in Employment

| Dependent variable: 5-year average real GDP- per-worker growth | (1) | (2) | (3) | (4) | (5) | (6) |
|---|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| 5-year average financial intermediation share in total employment | 3.345*** (0.690) | 3.335*** (0.677) | 3.354*** (0.675) | 3.347*** (0.706) | 3.341*** (0.705) | 5.574** (2.602) |
| 5-year average financial intermediation share in total employment <i>squared</i> | -43.35*** (9.025) | -43.31*** (9.004) | -43.48*** (8.980) | -43.37*** (9.516) | -43.30*** (9.493) | -103.6*** (35.82) |
| Log of real GDP per worker | -3.346*** (0.665) | -3.334*** (0.672) | -3.409*** (0.708) | -3.417*** (0.708) | -3.407*** (0.707) | -6.087*** (1.537) |
| 5-year working population growth | | 0.0243 (0.189) | 0.00762 (0.174) | 0.00799 (0.174) | 0.0129 (0.181) | -0.111 (0.237) |
| 5-year average openness to trade | | | 0.00195 (0.00431) | 0.00194 (0.00442) | 0.00193 (0.00439) | 0.0171 (0.0173) |
| 5-year average government consumption share in GDP | | | | 0.00260 (0.0581) | 0.00249 (0.0586) | -0.360 (0.269) |
| 5-year average CPI inflation | | | | | -0.00256 (0.0236) | 0.0181 (0.0250) |
| Turning point (in %) for the effect of financial intermediation share in total employment on real GDP-per-worker growth | 3.86 | 3.85 | 3.86 | 3.86 | 3.86 | 2.69 |
| 95% confidence interval | [1.20;6.51] | [1.28;6.42] | [1.29;6.42] | [1.22;6.50] | [1.22;6.50] | [-6.34;11.7] |
| Observations | 95 | 95 | 95 | 95 | 95 | 95 |
| R-squared | 0.331 | 0.331 | 0.333 | 0.333 | 0.333 | 0.536 |

Note: The dependent variable is the 5-year average real GDP-per-worker growth for 1980–2009 for each country, which yields 6 observations per country. 5-year averages for the independent variables are computed over the same period as the dependent variable. The log of real GDP per worker is the natural logarithm of real GDP per worker for the initial year of the period over which the averages are computed, divided by 100. All estimates include a non-reported constant. Column (6) includes country dummies. Robust standard errors are in parentheses. Significance at the 1/5/10 per cent level is indicated by ***/**/*. The turning point is the level of the financial sector's share in total employment below (above) which an increase in the financial sector's share in total employment is estimated to raise (reduce) real GDP-per-worker growth. For country sample and sources, see data appendix.

To see what these numbers mean, one may first look at the recent data for the sample countries and evaluate them against the estimate for the turning point of 3.9 per cent reported at the bottom of Table 4.3. Figure 4.4 shows that in most countries, the financial sector's share in total employment is below or significantly below the threshold beyond which the effect on GDP-per-worker growth turns from positive to negative. Indeed, the size of the financial sector is above this growth-maximizing point only in some cases. Examples are Canada, Switzerland, Ireland and, to a lesser extent, the United States. However, as was stressed above, the growth-maximizing size of the financial sector should not be considered as a target, in particular because it is possible that the negative effect on growth may start materializing for lower levels. From that point of view, all countries in the sample are considerably above the lower band of the 95 per cent confidence interval around the estimate for the turning point. This means that for all countries, further increases in financial sector size are most likely to have mixed effects on productivity growth. However, this result also owes to the limited sample being used, which mechanically raises the size of the confidence interval around the estimated turning point.

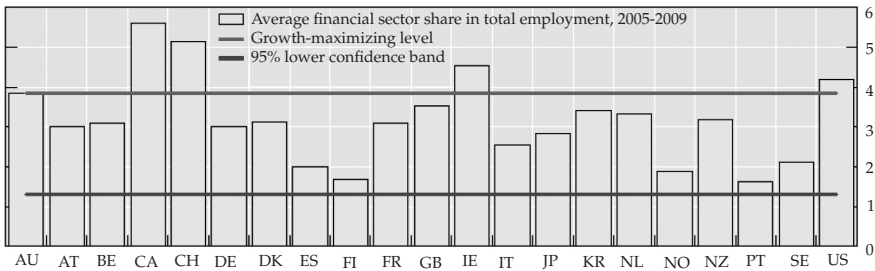


Figure 4.4: Average Financial Sector Share in Total Employment, 2005–09

Sources: OECD structural analysis database; authors' calculations.

Note: AU = Australia, AT = Austria, BE = Belgium, CA = Canada, CH = Switzerland, DE = Germany, DK = Denmark, ES = Spain, FI = Finland, FR = France, GB = United Kingdom, IE = Ireland, IT = Italy, JP = Japan, KR = Korea, NL = Netherlands, NO = Norway, NZ = New-Zealand, PT = Portugal, SE = Sweden, US = United States.

Coming back to the countries where the financial sector's share in total employment is above the growth-maximizing point, one can compute the gain in GDP-per-worker growth if their financial sectors were to shrink back to the growth-maximizing point. For Canada, the gain is 1.3 percentage points, for Switzerland 0.7 percentage points and for Ireland 0.2 percentage points.

The case of Ireland is interesting because over the period 1995–99, the share of the Irish financial sector’s share in total employment was 3.84 per cent – very close to the growth-maximizing value. But over the next 10 years, the share rose to more than 5 per cent. Had the share been constant between 1995–99 and 2005–09, the estimates suggest that Irish trend GDP-per-worker growth could have been as much as 0.4 percentage points higher over the past decade.

The Real Effects of Financial Sector Growth

Having established that there is a point at which financial development switches from propelling real growth to holding it back, this section now turns to an examination of the impact of the speed of development on productivity growth. Put another way, one examines how financial sector booms – periods when financial development is moving at a particularly fast pace – can affect growth.¹¹

Unlike in the earlier exercise, one cannot simply rely on the ratio of private credit to GDP to measure financial sector growth. If this is done, financial sector growth would be negatively associated with GDP growth by construction. To bypass this problem, data on employment in the financial sector are used and financial sector growth is measured as the growth rate in the financial sector’s share in total employment.

As noted in the previous section, using employment data comes at a cost since employment data for the financial sector are available for a limited subset of the previous sample of countries. Hence, this section focuses on the 21 country subset of OECD countries.

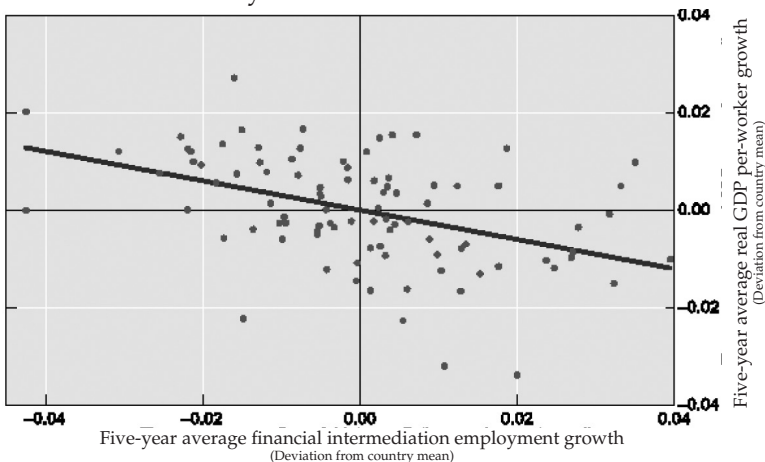


Figure 4.5: Financial Sector Growth and Productivity Growth

Note: Graphical representation of $\Delta y_{k,t+5,t} = \alpha + \beta_k + \gamma_0 \Delta fd_{k,t,t+5} - \delta y_{k,t} + \epsilon_{k,t}$ over the period 1980–2009, where $y_{k,t}$ is the log of output per worker in country k in year t ; $\Delta y_{k,t+5,t}$ is the average growth in output per worker in country k from time t to $t+5$; $\Delta fd_{k,t+5,t}$ is the average growth in financial intermediation employment in country k from time t to $t+5$; β_k is a vector of country dummies; and $\epsilon_{k,t}$ is a residual. For country sample and sources, see data appendix

Figure 4.5 summarizes the main finding. Again, on the vertical axis the 5-year average GDP-per-worker growth is plotted. On the horizontal axis, the 5-year average growth in the financial sector's share in total employment is now plotted.¹² (As in Figures 4.2 and 4.3, both variables are measured as deviations from their country-specific means.) The result is quite striking; there is a very clear negative relationship. The faster the financial sector grows, the slower the economy as a whole grows! In order to verify that this relationship is robust, the same procedure as before is followed, estimating a panel regression with the 5-year average annual growth rate in GDP per worker as the dependent variable. In addition to the controls used in Equation 4.1, financial sector growth can be added. But, unlike in the earlier exercise, one cannot simply take the change in the ratio of private sector to GDP as the object of interest. If one does this, the GDP growth would be found on the left-hand side of the regression and the inverse of GDP growth on the right-hand side, so finding a negative relationship would be wholly uninformative. It is for this reason that financial sector growth is measured using employment growth and estimate:

$$\Delta y_{k,t+5,t} = \alpha + \beta_k + \gamma_0 \Delta fd_{k,t+5,t} + \gamma_1 X_{k,t+5,t} + \delta_{k,t} \quad (\text{Equation 4.2})$$

Where, all variables are defined as before, with the exception of $\Delta fd_{k,t+5,t}$, which is the average growth in the financial sector's share in total employment in country k from time t to $t+5$. It may be noted that the vector of controls in Equation 4.2 includes the growth rate of the working population, trade openness measured as the ratio of imports plus exports to GDP, the share of government consumption in GDP, CPI inflation and the level of financial development.

Table 4.4 presents the results of estimating Equation 4.2 using a variety of measures of financial sector size as controls. The interest

is in the first row of the table, which reports the estimates of γ_0 , the coefficient on the financial sector growth. The result evident in Figure 4.4 is confirmed by more careful statistical analysis – the faster financial sector employment grows, the worse it is for productivity growth (measured as 5-year average growth in GDP per worker). Moreover, this effect survives regardless of the combination and definition of the controls.¹³

To assess the magnitude of the effects, one may start by comparing a country with constant employment in financial intermediation with one in which employment grows at 1.6 percentage points per year, the sample average for those with positive growth. The elasticity estimate of -0.33 implies that the first country will grow on average 50 basis points faster than the second country. Given that the sample average productivity growth rate is 1.3 per cent, this strikes us as sizeable.

Table 4.4: GDP-per-worker Growth and Financial Sector Growth

| Dependent variable: 5-year average real GDP-per-worker growth | (1) | (2) | (3) | (4) | (5) |
|---|----------------------|----------------------|----------------------|----------------------|----------------------|
| 5-year average financial intermediation employment growth | -0.471*** (0.083) | -0.327*** (0.074) | -0.325*** (0.073) | -0.328*** (0.073) | -0.331*** (0.074) |
| 5-year working population growth | -0.356* (0.204) | -0.275 (0.186) | -0.286 (0.183) | -0.270 (0.188) | -0.259 (0.191) |
| 5-year average openness to trade | 0.007 (0.0148) | 0.022 (0.0138) | 0.023 (0.0143) | 0.022 (0.0142) | 0.022 (0.0138) |
| 5-year average government consumption share in GDP | -0.762*** (0.212) | -0.636*** (0.219) | -0.626*** (0.220) | -0.637*** (0.220) | -0.635*** (0.219) |
| 5-year average CPI inflation | 0.021 (0.018) | 0.011 (0.018) | 0.011 (0.018) | 0.011 (0.018) | 0.011 (0.018) |
| Log of real GDP per worker | -0.083*** (0.014) | -0.073*** (0.012) | -0.072*** (0.012) | -0.074*** (0.012) | -0.076*** (0.012) |
| Financial intermediation share in total employment | -1.732*** (0.529) | | | | |
| Private credit to GDP | | -0.001 (0.005) | | | |

| Dependent variable: 5-year average real GDP-per-worker growth | (1) | (2) | (3) | (4) | (5) |
|---|-------|-------|-------------------|-------------------|------------------|
| Private credit by banks to GDP | | | -0.002 (0.006) | | |
| Financial system assets to GDP | | | | -0.000 (0.006) | |
| Banking system assets to GDP | | | | | 0.002 (0.005) |
| Observations | 104 | 110 | 110 | 110 | 110 |
| R-squared | 0.616 | 0.583 | 0.584 | 0.583 | 0.583 |

*Note: The dependent variable is the 5-year average real GDP-per-worker growth for 1980–2009 for each country. 5-year averages for the independent variables are computed over the same period as the dependent variable. The log of real GDP per worker is the natural logarithm of real GDP per worker for the initial year of the period over which the averages are computed. The financial intermediation share in total employment is the share of the financial intermediation sector in total employment for the initial year of the period over which the averages are computed. Private credit (by banks) to GDP is the ratio of private credit (by banks) to GDP for the initial year of the period over which the averages are computed. Financial (banking) system assets to GDP are measured as the ratio of financial (banking) system assets to GDP for the initial year of the period over which the averages are computed. All estimates include country dummies. Robust standard errors are in parentheses. Significance at the 1/5/10 per cent level is indicated by ***/**/*.* For country sample and sources, see data appendix.

Turning to some country examples, one may look at Ireland and Spain; admittedly extreme cases. During the 5 years beginning in 2005, employment in Irish and Spanish financial sectors grew at an average rate of 4.1 per cent and 1.4 per cent per year, while output per worker fell by 2.7 per cent and 1.4 per cent, respectively. The estimates imply that if financial sector employment had been constant in these two countries, it would have saved 1.4 per cent points from the decline in Ireland and 0.6 percentage points in Spain. In other words, financial sector growth accounts for one-third of the decline in Irish output per worker and 40 per cent of the drop in Spanish output per worker.

Overall, the lesson is that big and fast-growing financial sectors can be very costly for the rest of the economy. They draw in essential resources in a way that is detrimental to growth at the aggregate level.

Conclusion

In this chapter, the authors have studied the complex real effects of financial development and come to two important conclusions. First, financial sector size has an inverted U-shaped effect on productivity growth. That is, there comes a point where further enlargement of the financial system can reduce real growth. Second, financial sector growth is found to be a drag on productivity growth. Their interpretation is that because the financial sector competes with the rest of the economy for scarce resources, financial booms are not, in general, growth-enhancing. This evidence, together with recent experience during the financial crisis, leads one to conclude that there is a pressing need to reassess the relationship of finance and real growth in modern economic systems. More finance is definitely not always better.

Appendix 4.1

Data sources for Figure 4.1 and 4.2 and Tables 4.1 and 4.2:

Penn World Tables – real GDP per worker, working population, ratio of imports and exports to GDP, ratio of government consumption to GDP and CPI.

World Bank Financial Structure and Development database – ratio of private credit to GDP.

50 countries – Argentina, Australia, Austria, Bangladesh, Belgium, Brazil, Canada, Chile, China, Colombia, the Czech Republic, Denmark, Egypt, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, India, Indonesia, Ireland, Italy, Japan, Korea, Luxembourg, Mexico, Morocco, the Netherlands, New Zealand, Nigeria, Norway, Pakistan, the Philippines, Poland, Portugal, Russia, Slovakia, Slovenia, South Africa, Spain, Sweden, Switzerland, Thailand, Turkey, the United Kingdom, the United States, Venezuela and Vietnam.

Data sources for Figure 4.3 and 4.4 and Tables 4.3 and 4.4:

Penn World Tables – real GDP per worker, working population, ratio of imports and exports to GDP, ratio of government consumption to GDP and CPI.

World Bank Financial Structure and Development database – ratio of private credit to GDP, ratio of private credit by banks to GDP, financial system assets to GDP and banking system assets to GDP.

OECD Structural Analysis database – financial sector's share in total employment.

21 countries – Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, Korea, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom and the United States.

Endnotes

- ¹ This chapter was prepared for the Reserve Bank of India's Second International Research Conference in Mumbai, India, during 1–2 February, 2012. We thank Claudio Borio, Leonardo Gambacorta, Christian Upper and Fabrizio Zampolli for helpful suggestions and Garry Tang for valuable research assistance. The views expressed in this chapter are those of the authors and not necessarily those of the BIS.
- ² The view that financial development is simply a by-product of growth is discussed in Robinson (1952): 'Where enterprise leads, finance follows'. For the more recent work establishing causality, see Levine et al, (2000) for country-level evidence and Rajan and Zingales (1998) for industry-level evidence. For an alternative view, see Easterly et al (2000), who suggest that financial development may only be good up to a point.
- ³ See Pagano (1993) for a simple analytical model of financial development as a reduction in transaction costs in the context of an endogenous growth model. A more comprehensive approach is developed in Holmström and Tirole (1997), who provide a model for why different financial patterns (direct finance vs intermediated finance) may coexist altogether.
- ⁴ Theoretical contributions related to the role of financial intermediaries to the composition of investment include Acemoğlu and Zilibotti (1997), who look at how the presence of financial intermediaries affects the risk return profile of entrepreneurs' projects; Holmström and Tirole (1998), who examine how financial intermediaries can help save on liquidity hoarding and Aghion et al (2010), who show how financial development helps reduce the growth cost of economic fluctuations.
- ⁵ Philippon and Reshef (2009) provide empirical evidence that, over the past thirty years, the US banking industry has become relatively skilled and labour intensive. Analytical contributions investigating occupational choices between producing and financing include Philippon (2007), which provides a model where human capital is allocated between

entrepreneurial and financial careers, and where entrepreneurs can innovate but face borrowing constraints that financiers can help to alleviate. Cahuc and Challe (2009) also develop an analytical model focusing on the allocation of workers between financial intermediation and production sectors in the presence of asset price bubbles.

- ⁶ This section builds on an extensive body of research, especially the empirical literature that relates growth to finance. Notable contributions on this topic include King and Levine (1993), Islam (1995), Levine and Zervos (1998), Beck et al (2000) and Cecchetti et al (2011). Comprehensive surveys can be found in Levine (1997, 2005).
- ⁷ It is noted that the results reported in Table 4.1 are robust to adding a variety of changes to Equation 4.1. These include: (i) using GDP per capita instead of GDP per worker as the dependent variable; (ii) using alternative measures of financial development like private credit by banks to GDP, bank deposits to GDP, financial system deposits to GDP, or bank assets to GDP; and (iii) dropping certain countries, such as the former communist countries, from the sample.
- ⁸ The difference between the estimates is probably a result of differences in data and methods. The current study uses a broader set of countries, while the latter employs a somewhat more sophisticated econometric model.
- ⁹ This argument is consistent with the results of welfare maximization, which would imply that, in normal times, debt should be maintained below the level at which borrowing constraints become binding.
- ¹⁰ Introducing country fixed effects changes the results only modestly. In particular, the estimated coefficient for the linear and the quadratic term are such that the share of financial intermediation in total employment that maximizes growth is lower than the one obtained without country fixed effects. This reinforces the idea that the estimated turning point should be regarded not as a target but rather as an upper bound.
- ¹¹ There is a large and well-known literature on this financial accelerator and its quantitative implications for the business cycle [see Bernanke and Gertler (1989) and Bernanke et al, (1999), for instance]. Likewise, there is a significant body of research examining credit cycles [from Kiyotaki and Moore (1997) to more recent work by Caballero et al (2006) on the dotcom bubble or Lorenzoni (2008), who look at the normative implications of credit booms]. Any empirical studies on the implications of financial booms for long-run growth is unknown.
- ¹² The results reported in this section are robust to the use of financial sector value added in place of the financial sector's share in total employment.
- ¹³ Note that the effect of control variables is relatively different from what it was in the previous regression. In particular, government size now has a significant negative effect on growth at the margin. This could be

related to the fact that here we focus on advanced economies, where high government consumption is more likely to have a detrimental effect on the private sector. The speed of convergence is also much higher (between 7 and 8 per cent a year) than in the previous regressions, which is also probably related to sample difference.

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Post-crisis Debt Overhang

Growth Implications across Countries

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Introduction

Public debt in the OECD area passed annual GDP in 2011 and is still rising. For many countries, just stabilizing debt – let alone bringing it down to a more sustainable level – is a major challenge. Concerns about debt sustainability have manifested themselves in the Euro area debt crisis, but could spread beyond that area.

Both high debt levels and efforts to reduce them can affect growth. The debt overhangs can affect growth through channels such as raising the cost of capital and increasing the burden of distortionary taxation. The main focus of this chapter, however, is on the implications of reducing debt levels for growth both in the short term and in the long term. In the short term, the trade-off between macroeconomic stabilization and consolidation creates a particular challenge, especially in an environment where many countries need to implement fiscal consolidation more or less simultaneously and with policy interest rates close to the zero lower bound giving little scope for monetary policy to accommodate fiscal consolidation. In this context, fiscal consolidation needs to be carefully designed, notably in the choice of policy instruments which will affect the trade-off not only with short-term but also long-term growth.

The rest of the chapter is organized as follows: after a brief review of the lead up to the current debt debacle, the next section looks at the impact of high debt on economic growth and establishes consolidation needs, relying principally on fiscal gap calculations, and considers the factors likely to influence debt dynamics; then the combined challenge of consolidation and macroeconomic stabilization is discussed, considering the appropriate pace of consolidation and the consequences of international spillovers. This section also discusses the short-term impact through the multiplier effects of different instruments, with pension reform representing an extreme case of little initial impact but potentially large long-term impact on fiscal sustainability; the following section discusses available policy instruments and their implications for long-term growth. A final section concludes.

The Size of Debt Overhangs

Debt levels in the OECD have trended upwards since the early 1970s, with countries often insufficiently ambitious in bringing debt levels down during expansions. Indeed, during the upswing that preceded the recent crisis, underlying deficits were not reduced much, such that debt levels were not brought down, notably in Greece, the United Kingdom and the United States. In some cases, declines in revenue shares during the expansion suggest that governments were engaging in a pro-cyclical easing of fiscal policy; something which has been a consistent feature of policy in some European countries since the early 1970s (Égert, 2010). The impact of lower interest rates and, in some cases, lower debt on debt servicing and the apparent strength of revenues seduced some governments into cutting taxes and relaxing control over spending. Indeed, new estimates of underlying budget balances, which adjust not only for the effect of the economic cycle but also take account of asset price effects on revenues, suggest significantly weaker balances as a share of GDP in a number of countries, notably Ireland and Spain (Price and Dang, 2011). As such, when fiscal positions appeared to improve before the financial crisis, they often gave an impression that was too flattering. And, in retrospect, given the

weaknesses in financial sector prudential policy, fiscal positions were insufficiently robust given the scale of the liabilities and contingent liabilities that some governments had to assume during the crisis.

What sets the crisis apart is how widespread and rapid the build-up of debt has been, making the need for fiscal consolidation pressing for most OECD countries. The automatic stabilizers played a role with spending on unemployment benefits surging and tax revenues evaporating. Tax revenues were further dented by asset price movements, which had boosted revenues in the pre-crisis period. Spending further jumped due to support packages and assuming various liabilities. In addition, a downward level shift in potential output as an effect of the crisis effectively meant that prevailing levels of spending became inconsistent with pre-existing tax rates and implied a need to tighten just to standstill. For the OECD as a whole, gross government debt is expected to rise to unprecedented levels, exceeding 100 per cent of GDP for the first time in 2011 (Figure 5.1). In Japan, this ratio has risen to over 200 per cent of GDP. Even in some low-debt countries gross debt increased quite strongly. Only Norway and Switzerland have bucked the trend, reducing debt levels.

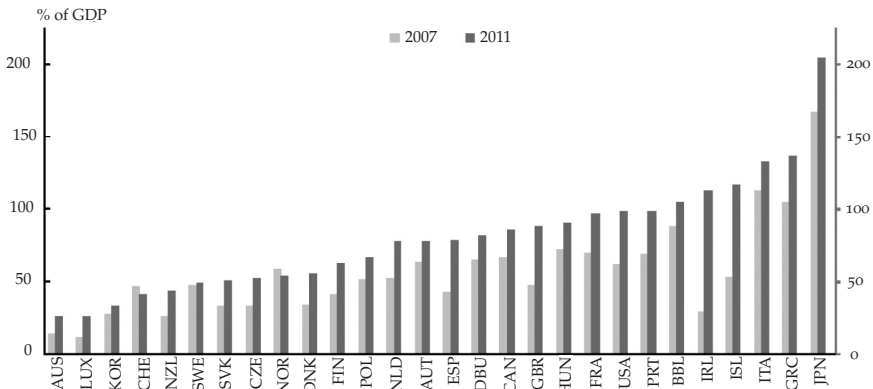


Figure 5.1: Gross Government Financial Liabilities

Source: OECD Economic Outlook 89 Database.

In emerging market economies, less debt build-up occurred over the crisis and debt levels are often more favourable than in many OECD countries, not least because high growth rates tend to ease

debt dynamics. Nonetheless, in a number of countries debt levels are not negligible. In Brazil and India, debt levels were around 65 per cent of GDP at the end of 2010. Fiscal consolidation is underway in both countries and Brazil is already running a relatively large primary surplus. For India, consolidation will be difficult due to large spending pressures and possibly weaker revenue growth. In China, the official debt burden was low at 19 per cent of GDP in 2010. However, off budget sub-central government and state enterprise debt could potentially raise total debt well over one-third of GDP at the end of 2010, with contingent liabilities in the financial sector of uncertain magnitude and the ongoing push to provide affordable housing potentially adding to debt.

Consequences of High Debt Levels for Growth

High public debt levels may have adverse effects on growth. Higher debt loads could affect output by raising the costs of capital or more speculatively through higher distortionary taxes, inflation or greater volatility in policy. Cournède (2010) demonstrated the potential impact of higher corporate financing costs, which may be a consequence of not only a normalization of the artificially low-risk premia that prevailed before the crisis but also of crowding out due to higher government issuance of debt. A higher cost of capital is likely to reduce the capital-to-labour ratio and hence productivity. Using the assumptions embodied in the OECD's medium-term baseline and a production function with three factors (labour, business sector capital and oil), the calculations suggest that the level of GDP in the long run would fall by just over 2 per cent in the United States and 2.6 per cent in the Euro area for a normalization of interest rates following the crisis, which would entail a real interest rate shock of around one percentage point in both the United States and the euro area. If higher government debt does lead to crowding out, with the real interest rate shock rising by around an additional percentage point, then the fall in GDP could be more substantial, with the level of output falling by around 5 per cent in both the United States and Euro area.

The effects of higher costs of capital on the intensity of capital in production should essentially lead to a level shift in potential output

and, therefore, to growth rate effects over some finite period only. More long-lasting effects on economic growth could arise to the extent where higher costs of capital lead to reduced investment in research and development. More speculative and uncertain combinations of OECD research suggest that if the fall in potential output by 3 per cent as a result of lower capital intensity were combined with the above higher cost of capital, then the stock of research and development (R&D) could fall by 5.4 per cent, which would reduce long-run total factor productivity (TFP) by 0.7 per cent, based on an estimated long-run elasticity (Guellec *et al.*, 2004). In practice, evidence on TFP growth in OECD countries before and after past crises suggests that experience is very heterogeneous (Figure 5.2). Since the impacts of debt via R&D should be expected to accrue via TFP, this underlines the need to treat the calculations with care.

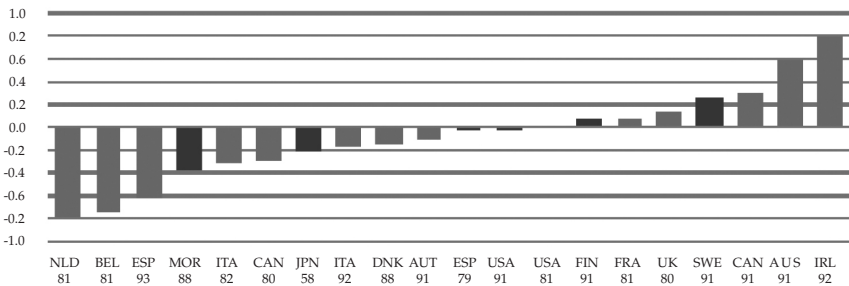


Figure 5.2: TFP Growth Following Severe Downturns

Source: Haugh and Ollivaud (2009)

Note: Change in the average annual growth rate comparing the 5 years following the start of the downturn with the 5 years preceding it. Darker bars note severe downturns associated with financial crises. The darker bars denote downturns that are associated with banking crises, see Haugh and Ollivaud, (2009).

Empirical work has identified various thresholds in the relationship between public debt and growth. For example, Reinhart and Rogoff (2010) found that growth rates in both developed and developing countries where the public debt to GDP ratio exceeds 90 per cent are about 1 per cent point lower than in the less indebted countries (Cecchetti *et al.*, 2011 find a similar threshold effect). In a similar vein, Caner *et al.* (2010) found a threshold effect on growth rates at 77 per cent of GDP for a large sample of countries, with the threshold being

lower for emerging markets, and Kumar and Woo (2010) found that a 10 percentage point increase in debt reduces annual real per capita GDP growth by 0.2 percentage points per year, with the effect being smaller for advanced economies and some evidence for non-linearity beyond a debt/GDP ratio of 90 per cent of GDP.

Indeed, fitting density functions to growth rates of OECD countries suggests that growth is typically lower in periods that follow years of high debt (Figure 5.3). This is more obvious when looking at growth rates over a short window of 5 years, where some of the effect may reflect that high debt is followed by consolidation with negative effects on the cycle. However, the effect appears to persist over 10 years when cyclical effects of consolidation should matter less. Even so, the relationship could be spurious to some degree given the secular tendency for debt levels to drift up and growth rates to trend down which may account for some of the relationship. Moreover, causality may be less than clear with, for example, less well managed countries likely to have both high debt and low growth. Though subject to some of the same caveats, the results of growth regressions that include government debt levels, suggest that debt may have a negative impact on subsequent growth (Box 5.1). Furthermore, there is some evidence that there may be two thresholds, at around 40 per cent of GDP and then close to 70 per cent of GDP, above which the negative effect becomes more important.

Box 5.1 Growth Regressions with Debt Thresholds

In the spirit of Cecchetti *et al.* (2010) a simple growth regression can be estimated using fairly standard explanatory variables and including a measure of debt. The sample includes 12 countries (Austria, Belgium, Canada, France, United Kingdom, Italy, Japan, Korea, Netherlands, Norway, Sweden, United States) using non-overlapping 5-year periods from 1965 to 2005 to create a panel with several time periods for each country. All explanatory variables are for the previous five year period. The estimation uses Ordinary least squares (OLS) and the Hansen bootstrap approach

to determine the possible debt thresholds (Hansen, 1999; Égert, 2010). The results should be taken with caution as there are likely to be a number of estimation problems, not least the bias introduced by estimating a dynamic model. Bearing this in mind, the results suggest that there may be thresholds in the relationship of debt with growth above which the impact becomes more important. The thresholds are relatively stable to changing the sample by dropping a country and re-estimating the relationship, though they can be sensitive to allowing the threshold to be close to the tail of the distribution. In the estimations the thresholds were identified with the restriction that at least 20 observations lie in each regime. When the number of observations is allowed to be smaller the upper threshold is closer to those identified in previous studies. When the sample changes in the time dimension the thresholds can also vary.

Table 5.1: Growth Regressions

Dependent variable: per capital real GDP Growth

| | Coefficient | Coefficient |
|--|-------------|-------------|
| Log of real per capital GDP | -0.036 *** | -0.035 *** |
| Years of education | 0.003 *** | 0.003 *** |
| Population growth | -0.082 ** | -0.071 * |
| Inflation | -0.051 | -0.063 * |
| Openness ratio | 0.003 | 0.003 |
| Saving rate as share of GDP | 0.000 | 0.000 |
| Government gross financial liabilities, share of GDP | -0.008 ** | |
| Gross financial liabilities < 45% of GDP | | -0.008 |
| Gross financial liabilities between lower and upper thresholds | | -0.009 ** |
| Gross financial liabilities > 66% of GDP | | -0.021 *** |
| Adjusted R-squared | 0.49 | 0.52 |
| Observations | 96 | 96 |

Notes: *, ** and *** denote statistical significance at the 10%, 5% and 1% levels.

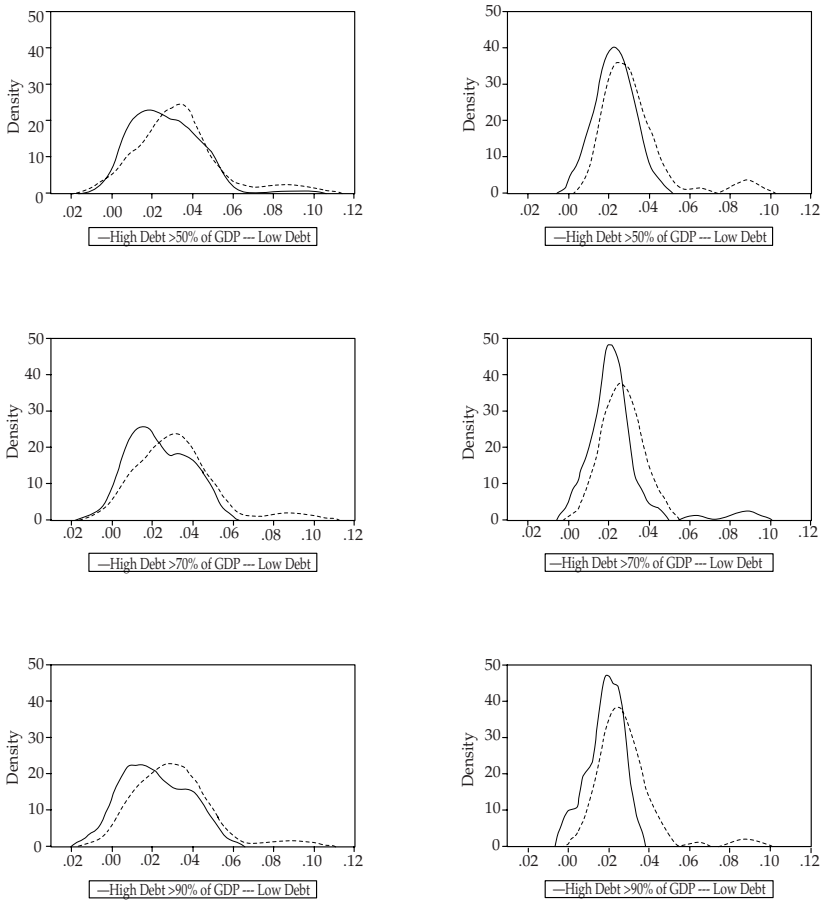


Figure 5.3: Growth Conditional on Past Debt Levels

Source: OECD Economic Outlook No. 89 Database

Note: Left-hand panel: growth in the following 5 years; right-hand panel: growth in the following 10 years/Top panel: debt threshold 50 per cent of GDP; middle panel debt threshold 70 per cent of GDP; bottom panel debt threshold 90 per cent of GDP.

The distributions are kernel densities for growth rates in the subsequent 5 and 10 years when growth rates are above and below the given threshold (see Box 5.1 for a description of the data).

In sum, high debt levels are likely to have negative impact on growth, though correlation is not the same as causation. Hence, there are good reasons for many countries to reduce their debt overhang including creating room to react to future shocks. Reducing debt, in

turn, has implications for growth both in the short and long term, with the scale of the necessary adjustment likely to give some indication of how painful fiscal consolidation will be. This issue is emphasized in the next section.

Size of Adjustment

Facing large debt overhangs, many countries have already started fiscal consolidation, which has implications for economic growth in the short term. In some cases, notably for those countries most under pressure from the bond markets, the ongoing and announced tightening is substantial, rapid and unusually correlated by historical comparison (Figure 5.4). Between the trough (measured by the underlying primary balance) following the onset of the crisis, which was 2009 for most countries, and the projected value for 2012, five countries are expected to tighten by more than 5 per cent of GDP (Greece, Iceland, Ireland, Portugal and Spain). In 11 other countries, underlying primary balances are expected to have tightened by more than 2 per cent of GDP. Recent policy announcements imply that these numbers would be larger if recalculated today.

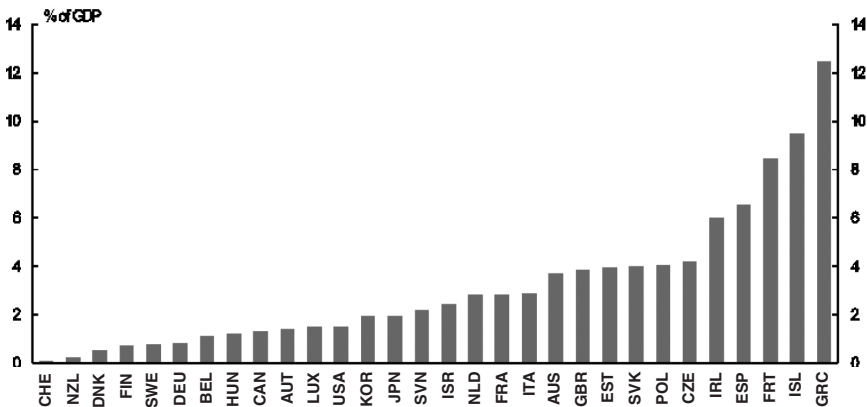


Figure 5.4: Cumulative Fiscal Tightening between the Deficit Trough and 2012 – Change in Underlying Primary Balance

Source: OECD Economic Outlook 90 Database.

Additional fiscal consolidation will be required beyond 2012. Recent OECD work has assessed these post-2012 needs, both in terms of stabilizing debt over the medium term and also in terms of meeting

prudent long-term debt targets. The consolidation requirements to stabilize debt (OECD, 2011c) are based on stylized assumptions about a sustained and gradual annual tightening of the underlying primary balance by 0.5 per cent of GDP until debt stabilization is reached. The long-term fiscal gaps, on the other hand, make an alternative stylized assumption that the tightening will be implemented immediately and sustained until 2050 to meet a specific debt target (Merola and Sutherland, 2012). Both sets of assumptions ignore the implications for output, which will obviously be important (discussed below). Both approaches come to similar conclusions on the need for consolidation, but here the focus is on the long-term fiscal gap calculations, which will be used later in the chapter to illustrate consolidation options.

Fiscal Gaps

The fiscal gap shows the *immediate* and *permanent* improvement in the underlying primary balance that is required to ensure that debt meets a target at a certain point in time, based on a simplified model of the economy and a number of assumptions about growth, interest rates, inflation and underlying fiscal policy (see appendix).² The presentation of the results below typically reports the fiscal gaps for ensuring gross financial liabilities is 50 per cent of GDP in 2050 (Box 5.2). This is intended to be illustrative and not normative. Indeed, different debt targets will be appropriate for different countries. For example, a low gross debt target may be less compelling for countries with large government financial asset holdings. In other cases, the public has demonstrated a preference for very low levels of debt. Countries with large implicit liabilities due to a large financial sector may wish to err on the side of caution. Although the 50 per cent target is arbitrary it may nonetheless be supported by some arguments. Thus, empirical estimation suggests that changes in the functioning of the economy occur around debt levels of 70–80 per cent of GDP. For example, interest rate effects of debt seem to become more pronounced (Égert, 2010), offsetting saving responses to discretionary policy changes become more powerful (Roehn, 2010) and, as illustrated above, trend growth seems to suffer. Building in a safety margin to avoid exceeding

the 70–80 per cent levels in a downturn may suggest aiming for 50 per cent or thereabout during normal times. In any case, over a very long period such as up to 2050, the size of fiscal gap does not depend strongly on the particular target debt level (see below).

Box 5.2: Debt Objectives

Various choices have to be made in setting a debt target:

The target can be based on either gross or net debt/financial liabilities. Gross financial liabilities are a visible headline indicator and typically the measure used in empirical analysis. Net financial liabilities are, in principle, more appropriate when considering long-term sustainability, though government net worth, which also takes into account non-financial assets (the public capital stock), may be the appropriate indicator when also considering inter-generational issues. However, there are serious problems due to lack of comparability across countries, particularly when valuing government non-financial assets. Furthermore, government assets may not be easily used to offset liabilities, at least in the short term. For example, it may not be advisable to privatize public enterprises operating in sectors with significant market failures or when financial markets could not easily absorb large asset sales. There may also be asymmetries across levels of government and with social security funds between the holding of assets and liabilities.

The scope of the public sector can vary. For example, the debt target may affect only the central government, general government or an even wider definition, including for instance, public enterprises. The choice can make a sizeable difference. In the United Kingdom, recent whole of government accounts estimated net liabilities to be 84.5 per cent of GDP in 2009–10, whereas the national accounts net liabilities measure was 52.8 per cent of GDP (HM Treasury, 2011).

If the focus is on servicing debt, then the measure of debt should correspond to gross interest bearing liabilities but if it is the present value budget constraint, all liabilities should be included.

The target should address the effect of ageing on entitlement spending (ageing is not the primary driver of health spending but is used as a catch-all label here). The appropriate degree of consolidation will need to take into account the impact of ageing-related spending. Ageing-related spending pressures stem from two factors. First, in many OECD countries spending ramps up with the demographic transition as the post-war 'baby boomers' move into retirement. As this transition is either already happening or is imminent, the policy options are limited. In this light, the 'hump' in spending may need to be absorbed and added to the consolidation requirement. A second, uncertain but potentially huge or even infinite, ageing effect on spending stems from longevity, which has been more or less steadily rising for more than 150 years across OECD countries. In this case, the appropriate response is to reform pension and other benefit systems, such as long-term care, rather than to attempt to pre-save to finance the rising ageing-related spending. Attempting to pre-save for future increase in longevity rather than adjusting pension and other welfare schemes would be unfair across generations and difficult in light of uncertainty concerning the development of longevity.

More generally, the target should also consider inter-generational fairness. Pay-as-you-go pension systems present an obvious example of a transfer of resources between generations. Likewise, 'excessive' deficits can transfer liabilities to future generations. In other cases, investment can create assets which will be enjoyed by future generations. As such, the degree of consolidation will need to consider the source of the transfer between generations and how much of a burden it is fair to pass onto future generations.

The fiscal gaps should be seen as giving a common metric for assessing the need for fiscal consolidation rather than being normative about how such a consolidation should be implemented. When the fiscal gap is large, it would be difficult to implement such a large consolidation effort immediately. Furthermore, sustaining the fiscal policy tightening, even seemingly modest ones, over very long periods may also present a considerable challenge. Finally, as the fiscal gaps

are based on meeting arbitrary debt targets in 2050, the evolution of gross debt is unlikely to be stable as a share of GDP at the end of the simulation. In some cases, for example, the fiscal gap will involve substantial undershooting of the debt target early in the simulation, masking pressures on public finances that will continue to mount beyond the end of the simulation.

Baseline Simulation: Baseline simulation shows the immediate tightening of the underlying primary balance in 2013 needed to ensure that gross financial liabilities are 50 per cent of GDP in 2050. The baseline assumes that pension, health and long-term care spending is constant as a share of GDP and, as such, the fiscal gaps present the minimum that is required to meet consolidation needs in the case when pensions and health schemes are reformed to alleviate any upward pressure on spending or when other spending categories are curtailed and taxes raised to accommodate such spending pressures (simulations incorporating spending pressures emanating from pensions, health and long-term care are presented below).

Fiscal gaps differ across countries mainly because of large differences in underlying deficits at the starting point and to some extent due to differences in the level of initial debt (Appendix Table). Countries already undertaking large fiscal consolidations (Greece, Iceland, Portugal and Spain) generally face moderate fiscal gaps on the assumption that the present large improvements in underlying primary balances are maintained. Countries where underlying deficits are expected to remain substantial in 2012 face much larger fiscal gaps. For example, the fiscal gaps for Japan, the United States, the United Kingdom and New Zealand exceed 5 per cent of GDP. On the other hand, a number of countries – Korea, Luxembourg, Sweden, and Switzerland – do not face any additional tightening requirements to meet the debt target. It may seem ironic that Euro area countries with relatively modest fiscal gaps are the victims of a virulent debt crisis whereas other countries with much larger fiscal gaps enjoy very low bond yields at present. This partly reflects concerns about potential needs for intervention in Euro area banking systems, but also that Euro area debt essentially corresponds to foreign currency denominated debt for the individual country. Lately,

pressures may also have reflected increased concerns about the integrity of the Euro area more generally.

When spending pressures projected to arise from health and long-term care and pensions are included, all countries, with the exception of Sweden, will require significant additional fiscal consolidation.

- In the case of health care spending, higher levels of spending are not necessarily undesirable, but financing higher spending can create difficulties (Hall and Jones, 2007). Two different sets of health care spending projections are used (Oliveira-Martins and de la Maisonnette, 2006). The average projected increases in health and long-term care spending by 2050 are 3.5 per cent of GDP in a low spending scenario, when it is assumed that spending increases above those related to demographic change and unitary income elasticity will gradually fade, and around 6 per cent of GDP in a high spending one. As the projected increases are relatively similar across countries, because health spending is not primarily driven by demographics but rather to a large extent by expected supply developments, the impact on the fiscal gaps does not vary much across countries. Nonetheless, the fiscal gaps rise over 1.5 per cent of GDP in Canada, the Czech Republic, Japan, New Zealand and Switzerland when greater cost pressures affect health spending (Figure 5.5).
- Including pension spending alters radically the fiscal gaps for many countries relative to the baseline scenario (Figure 5.5).³ The fiscal gaps of the countries facing the largest pension problems, such as Luxembourg, Belgium and Netherlands underscore that meeting these challenges would be better addressed by reform rather than pre-saving. In some cases, such as Greece and Spain, reforms to the pension systems in 2010, which are incorporated in the projections, have addressed significant pressures emanating from this source. In Sweden and Poland, the notionally defined contribution pension system means that no additional or even less tightening is required to meet a gross financial liabilities debt target of 50 per cent of GDP in 2050.

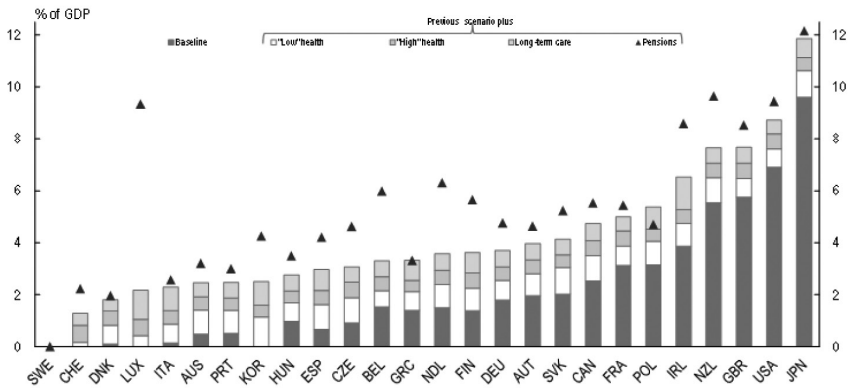


Figure 5.5 : Fiscal Gaps, Baseline and with Health and Long-term Care Spending and Pensions – Immediate Rise in the Underlying Primary Balance Needed to Bring Gross Financial Liabilities to 50 per cent of GDP in 2050

Source: Merola and Sutherland (2012)

Note: 'Low' health assumes policy action curbs health spending growth. 'High' health is the additional cost pressure in the absence of these policy actions.

The fiscal gaps do not change markedly relative to the baseline if alternative debt targets are used. This occurs because even relatively small changes to underlying fiscal positions add up when maintained for forty years. It is the same effect that lies behind initial debt levels having an only modest effect on fiscal gaps compared with initial deficit levels. Taking government financial assets into consideration may indicate that fiscal positions are in relatively better shape, notably for Japan. In other cases, such as in Finland, the large net asset position reflects pre-funding for pension spending.

Debt Dynamics

How will the debt overhang be worked off? A review of episodes of declining debt since the early 1970s suggests that improvements in the primary balance are more consistently important in reducing debt, though at times interest rate and growth dynamics can help.⁴ One possible decomposition of past debt developments shows the difference between the inertial contributions of debt dynamics on the one hand and the more direct policy lever of the primary balance on the other (Table 5.2). When debt has been falling in recent decades,

it has been typically accompanied by the primary balance having a negative effect on debt. The real interest rate and real growth rate effects often offset one another. That said, in some countries during the 1970s, negative real interest rates had an effect allowing them to run larger primary deficits.

Table 5.2: Episodes of Falling Debt: The Contribution of the Primary Balance, Inflation and Growth

| | Episode | Total change in gross financial liabilities, %GDP | Change after accounting for valuation effect | Primary balance | Of which real growth | Real interest |
|-----------|-----------|---|--|-----------------|----------------------|---------------|
| Australia | 1996-2008 | -27.7 | -18.1 | -24.0 | -11.6 | 17.6 |
| Belgium | 1994-2007 | -52.6 | -33.7 | -64.0 | -37.8 | 63.9 |
| | 1971-1976 | -11.7 | -0.3 | 5.7 | -10.9 | -1.1 |
| Canada | 1997-2000 | -19.6 | -19.8 | -21.7 | -17.1 | 25.5 |
| | 2002-2007 | -16.1 | -16.6 | -13.6 | -11.6 | 17.1 |
| | 1985-1989 | -12.5 | -15.3 | -31.7 | -7.5 | 21.3 |
| Denmark | 1994-2007 | -58.0 | -27.3 | -41.3 | -23.0 | 34.5 |
| | 1999-2001 | -6.0 | -0.8 | -3.4 | -5.8 | 6.8 |
| France | 1999-2001 | -2.4 | 7.7 | -5.0 | -4.0 | 8.8 |
| Germany | 1999-2003 | -15.7 | -9.2 | -16.6 | -9.2 | 14.6 |
| Italy | 1988-1991 | -13.6 | -10.8 | -11.2 | -14.0 | 10.0 |
| Japan | 1999-2007 | -33.2 | -27.3 | -19.8 | -19.3 | 3.2 |
| Spain | 1985-1990 | -24.6 | -13.5 | -25.8 | -9.4 | 13.4 |
| Sweden | 1997-2003 | -23.6 | -6.8 | -17.9 | -15.9 | 18.7 |
| | 1972-1976 | -20.1 | -6.6 | 8.6 | -6.9 | -12.8 |
| UK | 1978-1981 | -11.8 | 1.1 | 4.5 | -1.5 | -4.8 |
| | 1985-1990 | -18.3 | 3.4 | -9.1 | -9.1 | 11.9 |
| | 1999-2001 | -12.2 | -9.6 | -12.1 | -4.6 | 5.4 |
| | 1972-1974 | -5.4 | -5.9 | -1.5 | -4.5 | -0.7 |
| US | 1976-1979 | -3.5 | -4.5 | -0.2 | -5.4 | -0.2 |
| | 1994-2001 | -17.4 | -12.1 | -15.6 | -18.5 | 24.7 |

Source: OECD Economic Outlook No. 89 Database

Note: the decomposition is based on the relationship $d_t - d_{t-1} = \frac{r_t}{1+g_t} d_{t-1} - \frac{g_t}{1+g_t} d_{t-1} - pb_t$, where d is the debt as a ratio of GDP, r is the real interest rate, g is the real growth rate and pb is the primary balance as a ratio of GDP.

The Effects of Stronger Productivity Growth: Going forward, debt dynamics can be influenced by stronger productivity growth. To illustrate this, simple calculations reveal the effect of productivity growth on debt levels over a 10 year period (Table 5.3). Extending the calculation beyond the medium term would have a larger impact. Nonetheless, for the countries with the largest fiscal gaps, while productivity gains would help, the fiscal challenge remains large. In these calculations, interest rates are assumed not to change, although they would likely rise with a boost in productivity, thereby undoing some of the potential gains. On the other hand, if government spending did not rise fully in line with GDP, the gains from higher growth could be substantial by improving the underlying primary balance.

Table 5.3: The Effect of Higher Productivity on the Real Growth Effect

| Reduction in initial debt stock as per cent of GDP after 10 years with growth in the baseline (<i>OECD Economic Outlook 89</i> medium term baseline) and with growth rates raised by 0.25 and 0.5 basis points. | | | | |
|--|-----------------------------|--------------------------------|-------------------|-------------------|
| | Initial debt level % of GDP | Real growth effect as % of GDP | | |
| | | Baseline | +0.25 basis point | +0.5 basis points |
| Australia | 31 | 7.2 | 7.5 | 8.0 |
| Austria | 82 | 12.9 | 14.2 | 15.6 |
| Belgium | 100 | 13.5 | 15.2 | 16.9 |
| Canada | 88 | 15.2 | 16.5 | 17.9 |
| Czech Republic | 51 | 10.7 | 11.3 | 12.0 |
| Denmark | 60 | 8.2 | 9.2 | 10.2 |
| Estonia | 19 | 4.1 | 4.3 | 4.6 |
| Finland | 66 | 12.1 | 13.1 | 14.1 |
| France | 100 | 16.0 | 17.6 | 19.2 |
| Germany | 87 | 9.5 | 11.1 | 12.7 |
| Greece | 159 | 35.8 | 37.7 | 39.9 |
| Hungary | 81 | 11.5 | 12.9 | 14.2 |
| Iceland | 120 | 26.7 | 28.1 | 29.8 |
| Ireland | 126 | 34.8 | 35.9 | 37.4 |

| | Initial debt level % of GDP | Real growth effect as % of GDP | | |
|-----------------|-----------------------------|--------------------------------|-------------------|-------------------|
| | | Baseline | +0.25 basis point | +0.5 basis points |
| Israel | 70 | 19.5 | 20.2 | 21.1 |
| Italy | 128 | 14.7 | 17.1 | 19.4 |
| Japan | 219 | 32.8 | 36.4 | 40.0 |
| Korea | 33 | 7.5 | 7.9 | 8.4 |
| Luxembourg | 24 | 5.9 | 6.1 | 6.4 |
| Netherlands | 75 | 8.5 | 9.9 | 11.3 |
| New Zealand | 52 | 10.8 | 11.5 | 12.2 |
| Norway | 51 | 11.8 | 12.4 | 13.1 |
| Poland | 66 | 10.7 | 11.7 | 12.8 |
| Portugal | 116 | 26.7 | 28.1 | 29.6 |
| Slovak Republic | 51 | 10.2 | 10.9 | 11.6 |
| Slovenia | 56 | 6.8 | 7.9 | 8.9 |
| Spain | 75 | 17.8 | 18.7 | 19.7 |
| Sweden | 41 | 6.9 | 7.5 | 8.2 |
| Switzerland | 37 | 6.0 | 6.5 | 7.1 |
| United Kingdom | 93 | 17.1 | 18.5 | 19.9 |
| United States | 107 | 22.3 | 23.7 | 25.2 |

Source: Merola and Sutherland (2012).

Inflation and Interest Rates: One possible way to deal with a high debt level is to erode it through higher inflation, but this is likely to be accompanied by drawbacks. Higher inflation is most likely to have an effect in an environment when debt is non-indexed, maturity is relatively long and rollover requirements are low, given that interest rates are likely to respond to higher inflation rates.⁵ Even in this case, simulations presented in the 'OECD Economic Outlook 89' show that the contribution of inflation to reducing debt is modest (OECD, 2011c). For a standard country with debt around 100 per cent of GDP and an average maturity structure, 1 percentage point on inflation would typically reduce the debt ratio by some 5–6 per cent points assuming the interest rate on new borrowing rose in tandem with inflation. Getting debt to

even lower levels would correspondingly require higher permanent inflation rates. The drawbacks of such an approach to reducing debt would be felt principally through the negative growth effects of higher rates of inflation (OECD, 2003), some of which may accrue through associated higher price volatility as well as distortions created through interactions with the tax and benefit system (Edey, 1994).

For higher inflation to make a marked dent in debt levels, some form of financial repression would probably be needed to ensure interest rates remain low relative to inflation.⁶ Following the end of World War II until the beginning of the 1980s, financial repression often played a role in reducing the huge stocks of debt accumulated during the war. Reinhart and Sbrancia (2011) estimate that financial repression contributed to a ‘liquidation effect’ which, for example, amounted to a reduction of Italian government debt of around 5 per cent annually. Figure 5.6 presents suggestive evidence of financial repression during the 1970s, particularly after mid decade when inflation was no longer surging, during which a large wedge existed between the yield on 10-year government bonds and the effective interest rate the government was paying on debt. While financial repression may be one avenue to liquidate debt there are adverse consequences. For example, Jonung (2010) argues that the imbalances which developed as a cause of financial repression contributed directly to financial crises in the Nordic countries in the late 1980s and early 1990s.

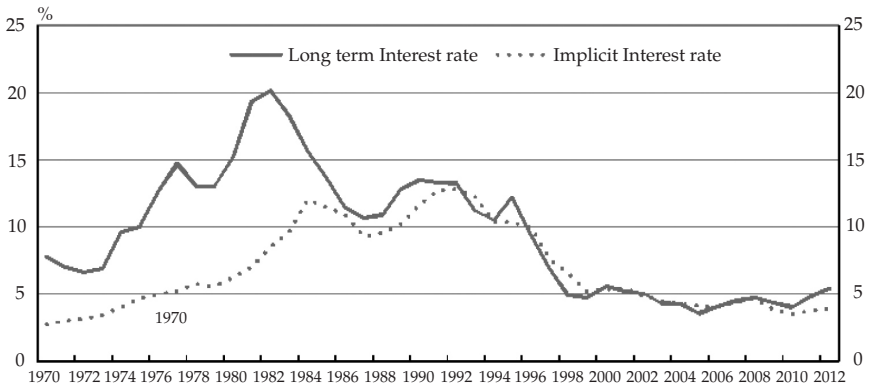


Figure 5.6: Borrowing Rates in Italy

Source: OECD Economic Outlook 90 Database.

Dynamics of Adjustment

The previous section suggested that relying on favourable debt dynamics to address the debt overhang may not be a viable option. Hence, improvements in the primary balance are called for. The pace of consolidation needs to balance consolidation requirements with the effects of fiscal retrenchment on aggregate demand. Ideally, in the short term, the pace should depend on the state of the public finances, the strength of the recovery, the ability of monetary policy to cushion the demand effects of fiscal tightening, and the need to signal a credible commitment to fiscal consolidation. However, there are significant uncertainties surrounding several such factors, which make gauging the appropriate pace of consolidation complicated. These uncertainties would argue for a consolidation strategy that could be implemented flexibly, capable of adjusting the speed and intensity as new information becomes available. Moreover, it argues for implementation that initially favours policies with comparatively low multipliers and reforms that underpin credibility, but have little negative effect on demand in the short run. For example, pension reforms can have large effects on long-term sustainability and may have little negative effect in the short term. Indeed, in so far as postponed retirement reduces the need for future pensioners to save for retirement there could, in principle, even be a positive effect.

The Pace of Consolidation

Given the high government debt-to-GDP ratios, some countries run the risk of unsustainable debt dynamics developing, especially if financing costs spike because of lack of credibility. While interest rates on government debt remain relatively low in many countries, debt levels in the wake of the crisis are significantly higher, implying latent upward pressure on borrowing costs. When interest rates are linked to government debt levels, this can tilt the case towards earlier consolidation. Even moderate delays may incur high costs with the development of particularly adverse debt dynamics (Corsetti *et al.*, 2011). On average for the OECD, interest payments accounted for around 2.5 per cent of GDP in 2007, but higher debt levels coupled

with a normalization of interest rates could push up interest payments to over 4 per cent of GDP in 2026 (OECD, 2011c). Thus, in countries which are particularly exposed to a financial market reaction the extent of consolidation may need to be larger and the pace faster than may be optimal if the main concern was the strength of the recovery.

The impact of fiscal consolidation on economic activity will depend on the size and time profile of the fiscal multipliers. To explore the potential importance of different consolidation strategies a number of simulations were run using the National Institute Global Econometric Model (NiGEM) macro-econometric model. The model embodies a set of multipliers that may differ depending on the assumptions under which the model is run, but more generally, the size of multipliers remains a subject of debate (Box 5.3). Differences across countries are largely related to the size and openness of the economy, the size of the public sector, the degree of dependence of consumption on current income and also the flexibility of the economy (Table 5.4). The multipliers in the model tend to be largest for government consumption, whereas tax impulses tend to have lower multipliers than spending. The differences in multipliers across instruments suggest that the sequencing of fiscal consolidations could start with tax increases before cutting government spending, though political economy considerations may suggest otherwise. Beyond the model-based multipliers, pension reforms that delay retirement may, as argued above, have particularly attractive features.

Table 5.4: First-year Multipliers across Countries

| Countries | Government spending | | Taxes | |
|-----------|---------------------|----------|----------|--------|
| | Consumption | Benefits | Indirect | Direct |
| Australia | -0.61 | -0.17 | -0.32 | -0.12 |
| Belgium | -0.16 | -0.04 | -0.02 | -0.03 |
| Canada | -0.43 | -0.13 | -0.1 | -0.08 |
| Denmark | -0.54 | -0.1 | -0.02 | -0.05 |
| Finland | -0.67 | -0.16 | -0.05 | -0.1 |
| France | -0.65 | -0.33 | -0.11 | -0.26 |
| Germany | -0.46 | -0.29 | -0.12 | -0.25 |

| Countries | Government spending | | Taxes | |
|----------------|---------------------|-------|-------|-------|
| Greece | -1.02 | -0.44 | -0.29 | -0.37 |
| Ireland | -0.33 | -0.11 | -0.06 | -0.08 |
| Italy | -0.62 | -0.17 | -0.06 | -0.12 |
| Japan | -1.15 | -0.58 | -0.43 | -0.48 |
| Netherlands | -0.51 | -0.19 | -0.05 | -0.15 |
| Austria | -0.55 | -0.18 | -0.05 | -0.13 |
| Portugal | -0.7 | -0.17 | -0.06 | -0.12 |
| Sweden | -0.4 | -0.17 | -0.05 | -0.13 |
| Spain | -0.74 | -0.17 | -0.16 | -0.12 |
| United Kingdom | -0.55 | -0.14 | -0.14 | -0.08 |
| United States | -0.9 | -0.25 | -0.27 | -0.16 |

Source: Barrell *et al.* (2012)

Note: First year multipliers based on the NiGEM model.

Box 5.3. Fiscal Policy Multipliers

The empirical research on the size of fiscal policy multipliers is voluminous and far from settled. Multipliers vary across countries and type of fiscal policy instrument, in part, due to differences in economic structures and the state of the economy, such as the state of financial markets (Cogan *et al.*, 2009). A wide range of factors could potentially influence the effect of fiscal consolidation on activity.

- Multipliers may change in potency due to the state of the economy. In particular, during a recession, when the output gap is negative, expansionary spending is less likely to crowd out private consumption or investment (Auerbach and Gorodnichenko, 2010). Furthermore, when the zero interest rate bound is no longer a constraint, monetary policy could respond to fiscal contraction and thus crowd in private demand (Christiano *et al.*, 2009; Woodford, 2010). At least in the short run, while interest rates are close to the zero bound, the contractionary effects of fiscal consolidation are likely to be stronger. Within Europe, the situation is more complex due to the scope for fiscal tightening to affect yield spreads through a number of channels. Furthermore, fiscal needs

across countries vary enormously making it impossible for a common monetary policy to provide appropriate accommodation everywhere.

- Whether a fiscal policy change is permanent or temporary can affect the size of the multiplier (Woodford, 2010; Cogan et al., 2009).
- Expectations may have an effect through private saving reactions to fiscal policy. Recent OECD work assessing ‘Ricardian equivalence’ suggests that the public–private saving offset becomes larger at high government debt levels (Röhn, 2010). These results suggest that at the current high level of government debt in many countries there may be a less contractionary effect from pursuing fiscal consolidation. However, with financial markets impaired some of this cushioning effect may be mitigated.
- Expectations may also matter in other cases. A fiscal consolidation strategy that includes credible cuts in the future would lower long-term rates immediately and provide some stimulus. While such an effect is unlikely to give much support in countries with very low bond yields, it could be more important for countries facing greater market pressure.
- A higher marginal propensity to consume out of current income by credit constrained households can lead to a sharper contraction in response to the consolidation. The potency of fiscal policy may also rise if collateral constraints limit access to financial markets (Roeger and in’t Veld, 2009). Financial market recovery may reduce the impact of these features, thus diminishing the size of multipliers during the consolidation period.

One strand of the empirical literature has argued that under certain circumstances fiscal consolidations can have non-Keynesian effects leading to so-called expansionary fiscal contractions (Giavazzi and Pagano, 1990). More recently, some authors have questioned the empirical approach behind these results. Guajardo *et al.* (2011), for example, examined the use of

changes in cyclically adjusted primary balances to identify fiscal consolidation episodes. If unsuccessful consolidation episodes fail relatively quickly the sample will only capture successful consolidations leading to a bias. If, instead, consolidation episodes are identified based on stated intentions by governments, they found that fiscal consolidations are typically contractionary.

Whether fiscal consolidation is exogenous to growth has also been questioned. If consolidations are typically initiated when growth is picking up, the finding of consolidation episodes being correlated with stronger growth would merely reflect that and not imply causality. Once this endogeneity is taken into account, the episodes based on movements in cyclically adjusted primary balances are also typically contractionary (Hernandez-De Cos and Moral-Benito, 2011).

With policy rates low in many countries, and the zero lower bound still an important constraint, monetary policy is unlikely to be able to offer much support, arguing for a gradual phasing in of consolidation measures. As economies recover, monetary policy is less likely to be constrained by the zero bound and thus the pace of consolidation could be increased. To explore the implication of the zero bound a simulation for the United States is based on this constraint being binding during the first year of the simulation. As interest rates cannot fall, consumption does not absorb as much of the shock and output falls by 0.1 per cent point more than in a baseline where the zero floor is not binding and with forward-looking consumers. In NiGEM myopic consumers are less influenced by short-term interest rates. Hence, the zero bound raises the multiplier by less if consumers are myopic, as can be seen from Figure 5.7. When agents are forward looking (which is equivalent to assuming that policies are credible), the negative multiplier effects are smaller than when compared with scenarios when agents have myopic expectations. The simulations for the United States suggest that the multiplier effect of fiscal consolidation, based on a cut to government consumption, would shrink from -0.9 when all agents are backward looking, to -0.6 when agents are forward looking, but adjustments are not instantaneous, and somewhere in between when

only consumers are myopic. In this context, policies and institutions that help commit government to fiscal probity have a potential role in cushioning activity in the short run.

Using the model to assess the implications of announced and partly implemented programmes (announcements since mid 2011 are not included and would strengthen the negative impacts) suggest that these are severe for the countries consolidating the most. In these simulations, which are based on simulations that are not in all cases realistic and may tend to make early consolidation look favourable, financial markets are forward looking, whereas consumers are myopic, all consolidation measures are permanent and monetary policy has some limited room to move. Moreover, the impacts of consolidation programmes are assessed one by one, rather than simultaneously. For example, the rapid and large consolidation in Greece is expected to lead to a cumulative reduction in GDP of over 6 per cent relative to the baseline (Figure 5.8). Other substantial impacts on output are projected by the model in Ireland, Portugal, Spain and the United Kingdom. When governments consolidate simultaneously, the implications for output are more severe due to international spillovers. Simulations reported in OECD (2009) suggest that multipliers increase by a factor of 0.25–0.5 in major OECD regions when they consolidate jointly as opposed to individually.

First year impact of 1% of GDP cut to government consumption.

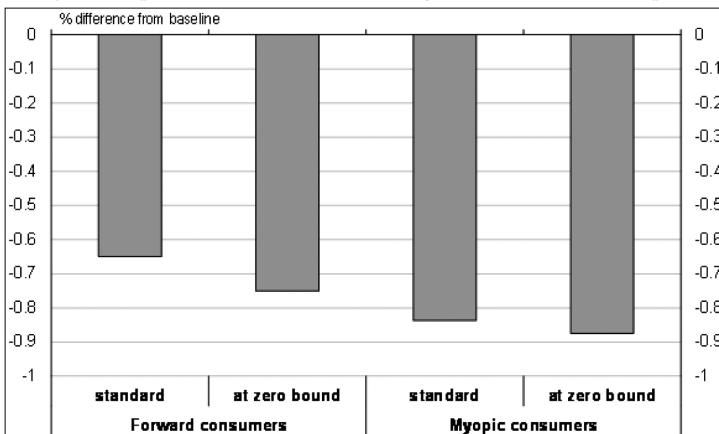


Figure 5.7: Impact of the Zero Lower Bound on Interest Rates on the US Consolidation Multiplier

Source: Barrell et al. (2012).

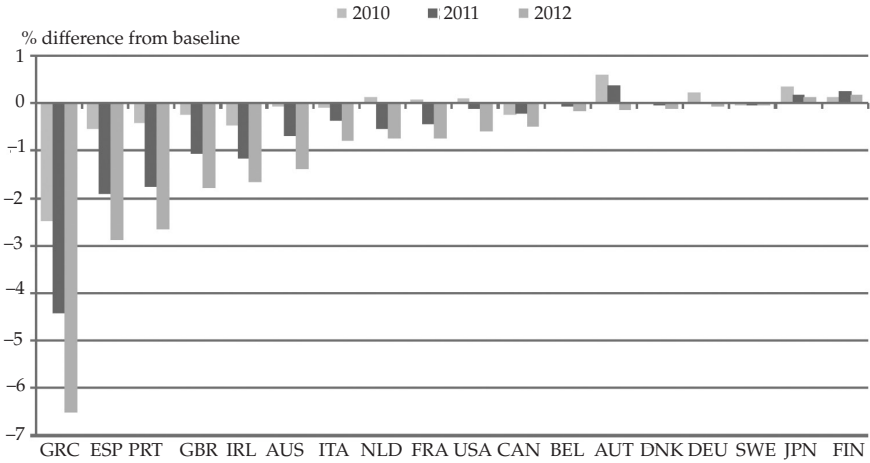


Figure 5.8: Impact of Announced Fiscal Consolidation on GDP

Source: Barrell et al. (2012).

Note: Assumptions include financial markets are forward looking, consumers are myopic, all consolidation measures are permanent and monetary policy targets inflation and the stock of money.

Consequences of Gradual and Delayed Consolidation Needs: When the state of fiscal policy doesn't dictate the pace of consolidation, more gradual tightening may minimize the short term pain but require a larger overall amount of consolidation. Simulations for the United States, using the long-run model behind the fiscal gaps and therefore assuming no impact of consolidation on output, shows that gradual tightening could allow adverse debt dynamics to develop (Figure 5.9). Thus, too slow a consolidation may require further fiscal tightening to bring debt down to prudent levels. This arises because debt levels above a threshold of around 75 per cent of GDP are assumed to incur a higher risk premium of four basis points for each additional percentage point of debt (Égert, 2010). Using the model, fiscal gap calculations examining the consequences of a short delay to fiscal consolidation generally find that for most countries this has little effect on the necessary tightening, as long as the subsequent consolidation is large, as implied by the fiscal gap. However, for countries where actual debt is high or current deficit levels imply a particularly rapid run-up in debt, such as New Zealand, the United Kingdom, the United States and Japan, even a short delay would

visibly increase the required tightening of the underlying primary balance to reach prudent debt levels.

Evolution of gross financial liabilities for the United States when the underlying primary balance is tightened so that debt is 50 per cent of GDP in 2050 and the consequences of phasing in the same tightening more gradually

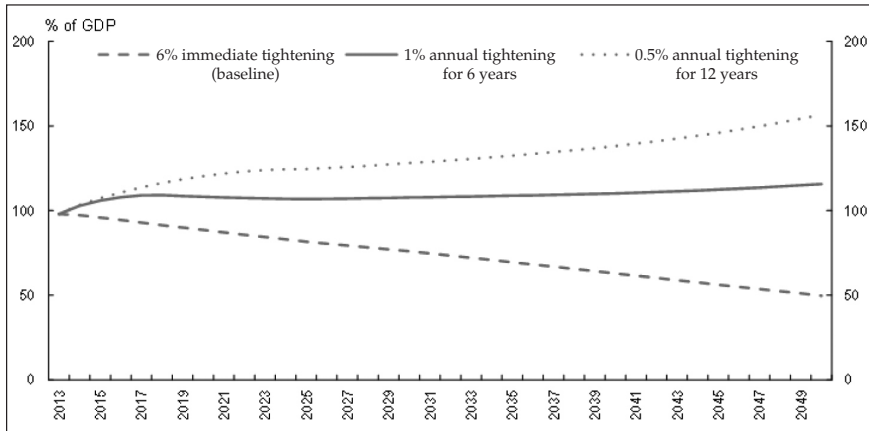


Figure 5.9: The Pace of Fiscal Tightening

Source: Merola and Sutherland (2012).

Long-term Growth and Choice of Instruments

The scale of consolidation suggests that consolidation should aim to use instruments that are friendly to long-term growth. In addition, supporting structural reforms can help, both through their implied effects on primary budget balances and to the extent higher growth is beneficial for debt dynamics. As concerns the primary balance and the respective contributions from lower spending and higher revenues, the 'optimal' size of government is not known. However, the marginal net social costs – including the excess burden of taxation – of additional public spending are usually thought to increase more than proportionately with the additional taxation needed to finance spending. Hence, given the current high level of public spending in many OECD countries and the future spending pressures due to population ageing, a large part of consolidation probably should consist of cuts in public spending and addressing drivers of future spending pressures. In countries where spending is low, greater emphasis may have to be put on revenue measures.

Table 5.5: Quantifying the Contribution of Various Policy Instruments to Fiscal Consolidation

| | AU S | AU T | BE L | CA N | CH E | CZ E | DE U | DN K | ES P | FR A | FI N | GB R | GR C | HU N | IS L | |
|--|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|--|
| 1. Social transfers | | | | | | | | | | | | | | | | |
| A. Family benefits | 0.5 | 0.7 | 0.6 | - | - | 0.1 | - | 1.4 | - | 1.1 | 0.9 | 1.3 | - | 1.4 | 1.0 | |
| B. Disability benefits | - | 0.3 | 0.2 | - | 0.5 | 0.5 | - | 1.3 | 0.6 | - | 0.9 | 0.3 | - | 0.6 | - | |
| 2. Pensions | | | | | | | | | | | | | | | | |
| A. Eliminate tax breaks | 2.7 | 0.1 | 0.1 | 2.0 | | 0.1 | 0.8 | | 0.2 | 0.0 | 0.1 | 1.2 | | | 1.0 | |
| 3. Health care | | | | | | | | | | | | | | | | |
| A. Increase efficiency | 0.5 | 1.8 | 2.1 | 2.5 | 0.5 | 1.3 | 1.3 | 2.8 | 1.6 | 1.3 | 2.5 | 3.7 | 3.9 | 1.7 | 1.9 | |
| 4. Education | | | | | | | | | | | | | | | | |
| A. Increase efficiency in primary and secondary education | 0.4 | 0.4 | 0.5 | 0.2 | 0.2 | 0.2 | 0.4 | 0.6 | 0.2 | | 0.2 | 0.2 | | 0.3 | 1.1 | |
| B. Introduce or raise tuition fees for tertiary education | - | 0.4 | 0.4 | - | 0.4 | 0.3 | 0.4 | 0.4 | 0.2 | 0.3 | 0.4 | - | 0.4 | 0.4 | 0.3 | |
| 5. Government wage bill | | | | | | | | | | | | | | | | |
| A. Restore public-private sector pay relativities | - | 0.3 | 0.6 | - | - | 0.4 | 0.2 | 2.0 | 1.0 | - | 0.5 | 1.8 | - | - | - | |
| 6. Reduce subsidies as share of GDP to OECD average | - | 2.3 | 0.8 | - | 2.4 | 0.7 | - | 1.2 | - | 0.2 | - | - | - | - | 0.4 | |
| 7. Broaden VAT base | 0.6 | - | 1.4 | - | - | - | 0.4 | - | 1.4 | 1.4 | 0.1 | 1.8 | 2.0 | 0.1 | 0.8 | |
| 8. Introduce or increase taxes on immovable property | - | 0.8 | 0.6 | - | 0.9 | 0.8 | 0.6 | - | 0.3 | - | 0.5 | - | 0.8 | 0.7 | - | |
| 9. Environmental taxes | | | | | | | | | | | | | | | | |
| A. Cut GHG emissions to 20% below 1990 levels via an emission trading system with full permit auctioning | 4.2 | 1.8 | 1.8 | 2.5 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | |

(Per cent of GDP)

Table 5.5: Quantifying the Contribution of Various Policy Instruments to Fiscal Consolidation (continued)

| | IR L | IT A | JP N | KO R | LU X | ME X | NL D | NZ L | NO R | PO L | PR T | SV K | SW E | TU R | US A | |
|--|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|-----|
| 1. Social transfers | | | | | | | | | | | | | | | | |
| A. Family benefits | 0.7 | - | - | - | 1.2 | - | 0.1 | 1.1 | 0.9 | - | - | - | 1.4 | - | - | - |
| B. Disability benefits | - | - | - | - | 0.1 | - | 0.8 | 0.7 | 1.8 | 0.6 | 0.3 | - | 1.3 | - | - | - |
| 2. Pensions | | | | | | | | | | | | | | | | |
| A. Eliminate tax breaks | 1.2 | 0.0 | 0.7 | | 0.5 | 0.2 | | | 0.6 | 0.2 | 0.1 | 0.2 | | | | 0.8 |
| 3. Health care | | | | | | | | | | | | | | | | |
| A. Increase efficiency | 4.8 | 1.1 | 0.8 | 0.6 | 2.0 | 0.7 | 2.7 | 2.6 | 1.5 | 1.5 | 1.0 | 2.7 | 2.7 | 1.5 | 1.5 | 2.7 |
| 4. Education | | | | | | | | | | | | | | | | |
| A. Increase efficiency in primary and secondary education | 0.3 | 0.4 | 0.2 | - | 0.5 | - | 0.3 | 0.3 | 0.8 | 0.2 | 0.1 | 0.2 | 0.5 | - | - | 0.8 |
| B. Introduce or raise tuition fees for tertiary education | 0.3 | 0.2 | - | - | 0.4 | 0.1 | 0.2 | - | 0.4 | 0.1 | 0.1 | - | 0.4 | 0.4 | - | - |
| 5. Government wage bill | | | | | | | | | | | | | | | | |
| A. Restore public-private sector pay relativities | 0.9 | 1.1 | 0.6 | - | 0.8 | - | 0.3 | 0.9 | - | 2.2 | - | 0.8 | 0.7 | - | - | 0.5 |
| 6. Reduce subsidies as share of GDP to OECD average | 1 | - | - | - | 0.2 | - | 0.1 | - | 0.7 | - | - | 0.2 | 0.1 | - | - | - |
| 7. Broaden VAT base | 0.4 | 2.6 | - | - | - | 2.5 | - | - | 0.2 | 1.4 | 1.2 | 0.6 | - | 3.3 | | |
| 8. Introduce or increase taxes on immovable property | 0.2 | 0.4 | - | 0.0 | 0.9 | 0.8 | 0.4 | - | 0.7 | - | 0.3 | 0.6 | 0.2 | 0.9 | - | - |
| 9. Environmental taxes | 1 | | | | | | | | | | | | | | | |
| A. Cut GHG emissions to 20% below 1990 levels via an emission trading system with full permit auctioning | 1.8 | 1.8 | 1.2 | | 1.8 | | 1.8 | 4.2 | | 1.8 | 1.8 | 1.8 | 1.8 | | | 2.2 |

Contd...

Notes:

- *An empty cell indicates that no information was available. Cells with a dash indicate that no savings are available from this source.*
- *Estimates for family benefits are based on reducing the figure reported in the OECD Socex Database to the un-weighted OECD average as a per cent of GDP.*
- *Estimates for disability benefits are based on reducing the figure reported in the OECD Socex Database to the un-weighted OECD average as a per cent of GDP.*
- *The elimination of tax breaks for retirement is based on data for 2007 from OECD (2011a) Pensions at a Glance.*
- *Health care efficiency estimates are from Joumard et al. (2010).*
- *Education efficiency estimates are based on Sutherland et al. (2007) updated to 2007 spending figures.*
- *Tuition fees for tertiary education are based on raising direct household expenditure for tertiary education institutions to the un-weighted average of those countries where households spend on this category.*
- *Government wage relativities are based on returning the government to private sector wage ratio in the early 2000s.*
- *Estimates for subsidies are based on reducing national account data for 2009 to the un-weighted OECD average.*
- *The figures for broadening VAT base assume collection efficiency rises to the un-weighted OECD average.*
- *The figures for immovable property are based on the un-weighted average for 2008 from the Revenue Statistics.*
- *Revenues from greenhouse gas emissions are based on de Serres et al. (2010).*

Given that spending cuts are largely unavoidable, a key question is how to maximize the positive and minimize the negative impacts on long-run growth, while at the same time considering other policy objectives such as equity concerns. In some cases, rethinking how distributional goals are achieved may offer scope to reduce transfers while encouraging greater labour force participation. In other cases, scope to minimize costs exists by aiming to improve both allocative efficiency (better use of resources) and technical efficiency (maximizing output for a given level of inputs). In most OECD countries, fiscal consolidation will also entail revenue reforms. There is scope to increase revenue by base broadening measures, particularly targeting so-called tax expenditures. When marginal rates need to go up, orientating measures towards those tax bases that have less distortionary effects can help to make fiscal consolidation on the revenue side less costly to long-term output. Finally, taxation of negative externalities may improve both welfare and public budgets.

Instrument Options

Social transfers: Reforms in a number of countries have aimed to transform social transfers so that vulnerable groups are protected, while encouraging greater labour force attachment. This includes, for example, reforming previously unconditional unemployment benefit systems and reorientating child and family benefits towards employment-conditional measures such as childcare support. In other cases, some transfers, such as disability benefits, have been prone to misuse. Measures which address inflows into disability rolls can be effective in reducing spending while encouraging greater labour force participation. If such measures allowed high spending countries to move towards the current cross-country average spending ratio on family and disability benefits, countries could enjoy savings of over 0.5 per cent of GDP on average and up to almost 3 per cent of GDP in some countries (Table 5.5), while boosting long-term output.

Greater efficiency: Work by the OECD has examined the opportunities to improve the efficiency in service delivery for health and education (similar savings are likely to be available in other spending programmes, Hagemann, 2012). These are important spending programmes accounting for about a quarter of government spending or on average across OECD countries around 10 per cent of GDP between them.

- No ‘one-size-fits-all’ exists for health, in the sense that no ‘model’ of health care delivery seems to be universally more cost efficient than other ‘models’. However, within each ‘model’ countries achieve widely divergent degrees of cost efficiency, suggesting that optimization at the margin rather than a switch of model is the best way to achieve savings. Indeed, adopting best practice policies could see potential efficiency gains in the region of 2 per cent of GDP on average by 2017 (Joumard *et al.*, 2010), thereby allowing savings to be made without compromising service delivery (Figure 5.10, Table 5.5).
- For primary and secondary education, schools adopting best practice measures could realize important savings, up to around 1 per cent of GDP in some cases (Sutherland *et al.*, 2007).

The estimates for school savings are based on benchmarking individual school performance against the best performing schools with similar student populations and resources (using data envelopment analysis). The implications of reducing inefficiency are then translated into aggregate resource savings by the implied possible reduction in staffing costs (Figure 5.11, Table 5.5).

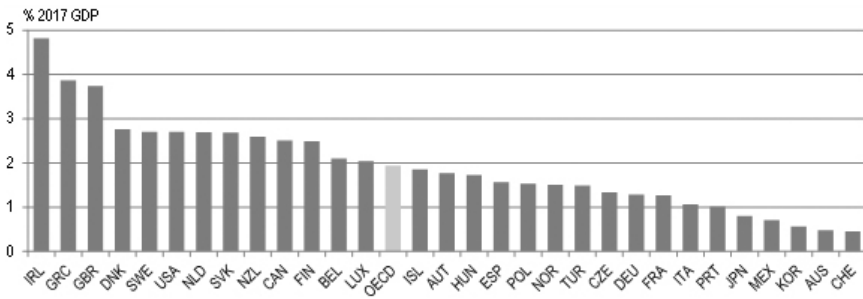


Figure 5.10: Potential Savings from Greater Efficiency in Public Health Care Spending

Source: Joumard et al. (2010b)

Note: Potential saving represent the difference between a no-reform scenario and a scenario where countries would exploit efficiency gains. The no-reform scenario assumes that between 2007 and 2017 life expectancy and spending in crease at the same pace as over the previous 10 years and that the mix between public and private spending remains constant over time.

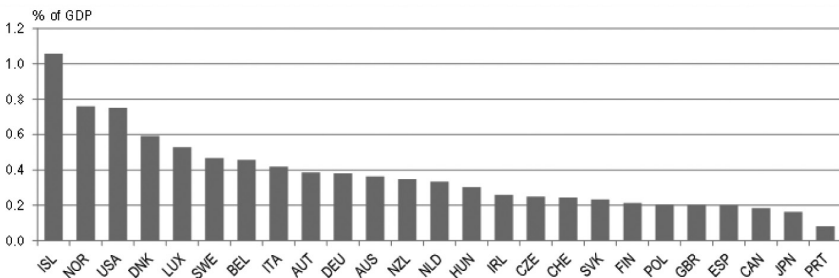


Figure 5.11: Potential Savings from Greater Efficiency in Primary and Secondary Education Spending

Source: Sutherland et al. (2007)

Government wages: Important gains can be achieved through management and pay reforms, and reducing the public sector wage bill is a candidate for fiscal consolidation in many countries. On an average, the general government wage bill is close to 10 per cent of GDP and accounts for roughly one quarter of overall spending. Indeed, there are countries where a large public–private sector wage gap has developed over time. Restoring the wage relativities in the early 2000s could yield significant savings in a number of countries (Table 5.5). Ireland and Hungary have demonstrated recently that substantial cuts in public sector wages can be implemented if there is an urgent need for consolidation and a case arising from public–private pay relativities. That said, comparing public and private remuneration levels poses serious challenges, and requires valuation of working conditions and non wage remuneration, such as defined benefit pension schemes. The ultimate test of adequacy is likely to be the difficulty or ease of recruitment into and retention in the civil service. From this perspective, budgetary savings achievable through reductions in the government wage bill should best be the outcome of a thorough review rather than across the board or arbitrary cuts in pay.

Subsidies: Subsidy reduction should rank high on the policy agenda as many subsidies may have surpassed their initial intended objective and may now have adverse economic effects. The elimination of subsidies (as defined in the national accounts), to the average for the OECD could yield sizeable savings in a number of countries (Table 5.5). Furthermore, by reducing the distortions they create, cutting subsidies offers the potential to boost growth.

Tuition fees: Close to a quarter of public spending on education is to support tertiary education, including tuition free attendance in many countries, especially in continental Europe. A large share of returns to publicly funded tertiary education accrue to individuals rather than to society (Blöndal *et al.*, 2002), and although some of the private returns are reduced by progressive taxes continued generous public support for higher education can be questioned. This is more so given the greater

prevalence of tertiary education among middle and upper income households. The introduction or increase of tuition fees may also improve educational outcomes, by making schools more responsive to market demands, with long-term gains to human capital, the quality of labour supply, the economy's rate of potential growth, and overall fairness. Introducing or raising tuition fees to the average spending in countries that use tuition fees could yield additional revenues of around 0.4 per cent of GDP (Table 5.5). Concerns that such reforms would reduce enrolment by students from poor backgrounds could, to a large extent, be addressed by loan programmes with repayment conditional on subsequent income level.

Tax expenditures: All OECD governments use tax expenditures to promote a range of policy objectives. The scope of tax expenditures varies greatly across OECD countries, but they account for very substantial revenue leakages in some cases. Not all tax expenditures are undesirable, though, as some improve equity–efficiency trade-offs, like the case of earned income tax credits. Many, however, are distorting, poorly targeted, and contribute to a lack of transparency. In some cases, estimates of the revenues forgone by tax expenditure can exceed a percentage point of GDP and the aggregate impact of all tax expenditures is likely to exceed several percentage points of GDP in most OECD countries. Typically, the most costly tax expenditures are those aimed at boosting retirement savings, promoting homeownership, health insurance and charitable giving (OECD, 2010a).

Two examples reveal the potential importance for consolidation of reforming tax expenditures in personal income tax:

- Tax-favoured treatment of saving for retirement is found to boost retirement savings *per se*, but there is scant evidence that it raises aggregate private saving. Instead, such tax breaks result in a reallocation of saving from non-tax preferred to tax-preferred vehicles, while causing substantial revenue leakages, which may even reduce aggregate national saving. Phasing out such incentives could yield 1.7 per cent of GDP or more in additional revenues on average across a sample of OECD countries (Antolin *et al.*, 2004).

- Preferential tax treatment of owner-occupied housing is one of the costliest tax preferences in many OECD countries. The most important source of housing-related revenue leakages arises from the tax exemption granted to the implicit rental income of the owner-occupied home. Whereas the owner of a residence that is rented pays tax on the rental payments (less interest and operational costs), the implicit rental income of the owner-occupant is tax-exempt in the vast majority of member countries, except in the Netherlands, Sweden and Switzerland.⁷ Despite the exclusion of the implicit rental income, some countries nevertheless allow the deductibility of mortgage interest, as well as property taxes (normally paid at the sub-national level). In addition, many countries provide favourable treatment to long-term capital gains from the sale of owner-occupied housing, adding further to the post-tax attractiveness of investment in housing. Thus, by removing a bias favourable to owner-occupied housing, reform could not only increase revenue but also improve the allocation of capital, boosting growth.

There are also important tax expenditures in indirect taxation. While VAT is widely recognized as an efficient and buoyant revenue source, its revenue potential is not fully used. Indeed, with the exception of New Zealand, a substantial portion of potential revenue is foregone in most countries due to a combination of reduced VAT rates, a narrow base, and low compliance (Figure 5.12). There is thus considerable scope for boosting revenue through VAT reforms (Table 5.5). Direct fiscal consolidation aside, broadening the base and reducing the number of rates offer scope to improve administration and compliance, by reducing complexity and countering political pressure for additional low rates. A more effective way to meet distributional objectives may be to target compensatory increased cash transfers or refundable tax credits to compensate low-income households.

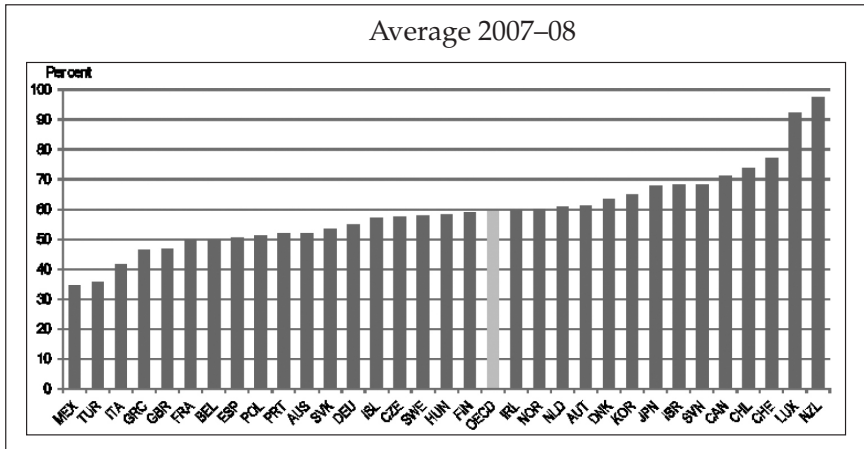


Figure 5.12: Value Added Tax Performance: The VAT Revenue Ratio

Source: OECD (2011), *Consumption Tax Trends 2010: VAT/GST and Excise Rates, Trends and Administration Issues*.

Note: The VAT revenue ratio measures the difference between the VAT revenue actually collected and what would theoretically be raised if VAT was applied at the standard rate to the entire potential tax base in a 'pure' VAT regime and all revenue was collected: The VAT revenue ratio equals $VAT\ Revenue / (Consumption * Standard\ VAT\ rate) * 100$.

Financial services are typically exempted from the VAT, largely due to technical difficulties in determining the precise tax base for margin-based services (*i.e.*, intermediation). Since much of VAT paid by financial service providers on inputs is non recoverable, the sector's VAT exemption causes a number of economic distortions that result in more household consumption of financial services, and less use of and greater self provision of financial services by businesses. However, the evolution of accounting methods and information systems has reduced the technical obstacles to imposing VAT on financial services considerably (OECD, 2010b). Moreover, following the recent financial crisis, there is increased interest among governments in both raising revenue from financial institutions and reducing moral hazard in the financial services sector via new taxes on financial services or (elements of) balance sheets.

Less distortionary tax bases: When tax rates need to be raised, some taxes are natural candidates for fiscal consolidation programmes both from an efficiency and revenue-raising perspective. The efficiency costs of taxes on immobile property are lower than on consumption or income, but represent a small share of overall tax revenue in many OECD countries.⁸ Where they are low or non-existent, corrective taxes such as so-called ‘sin’ taxes that can help deter harmful behaviours (e.g. alcohol and tobacco consumption), or taxes on polluting activities or consumption (e.g. fossil fuels) can improve welfare while boosting revenues.

Environmental taxes hold the promise of both boosting revenue and helping to achieve environmental objectives by discouraging pollution. While some countries raise considerable revenues from such taxes, reaching 4 per cent of GDP in Denmark and Netherlands in 2008, their yield is relatively low in several countries, notably Canada, New Zealand and the United States. Nonetheless, imposing a tax on carbon emissions or auctioning tradable emission rights to contain greenhouse gas emissions has become more widespread. For example, the European Union has auctioned permits as part of the Emission Trading Scheme. Despite such developments, many countries maintain differences in taxation depending on fuel type that run counter to estimates of environmental externalities. From a fiscal consolidation perspective, greenhouse gas levies consistent with international action to stabilize atmospheric concentrations of greenhouse gases by 2020, could generate around 2 per cent of GDP (de Serres *et al.*, 2010) (Table 5.5).

Summing up Potential for Primary Balance Adjustment

Table 5.5 brings together estimates quoted above on the potential contributions of spending and revenue measures to fiscal consolidation and could inform a choice of areas where potential may exist to make savings or increase revenues. Even without being able to quantify all the possible measures across countries, and not taking into account any dynamic effects, the cumulative potential cuts in spending (benchmarked using the OECD average or estimates of potential

efficiency gains) and increases in taxation (benchmarked using the OECD average) are sizeable. On average across countries, budget enhancements could reach around 7 per cent of GDP, with the larger part available on the spending side. Given that there are measures that are difficult to quantify this is a lower estimate. Furthermore, the potential tends to be somewhat greater in the English-speaking countries which generally face the larger consolidation needs. A large share of the savings in spending would come from reaping efficiency gains, which are likely to take some time to emerge. On the revenue side, relatively large opportunities exist for the greater use of environmental taxes and the broadening of income and indirect tax bases.

Supporting Reforms

In a number of cases supporting reforms could assist fiscal consolidation. Aside from their direct budgetary impact, as discussed above, reforms to pension systems that delay retirement and increase labour force participation will boost revenues and thereby reduce long-run budget pressures. Reforms that link retirement age to gains in longevity would thus help in cushioning budgets against future changes in longevity. More generally, growth-enhancing structural policy reform may support fiscal consolidation. This is most obvious when reforms, such as retirement reforms, lead to a higher sustainable employment level because such a change will have a permanent impact on the primary balance (Figure 5.13). The size of the effect will depend on the taxes levied on the additional income and consumption created as well as on whether the reform in question has any direct budgetary impact. The latter will be the case, for example, when additional spending on active labour market policy boosts aggregate spending or cutbacks on unemployment benefit duration reduces it. But many structural reforms have little direct impact on budgets while at the same time boosting employment levels, such as in the case of product market reforms that boost competition.

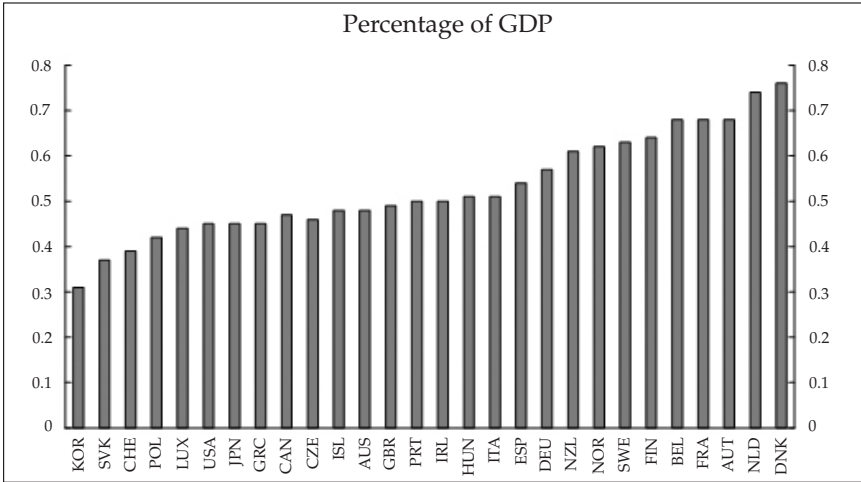


Figure 5.13: Effect of 1% Higher Potential Employment on the Primary Balance

Source: OECD Economic Outlook 88 database; and OECD calculations.

The effects of productivity-enhancing structural reforms on public budgets are less clear. Higher productivity in the private sector will tend to boost revenues but also spending unless public/private wage relativities change or transfer income replacement ratios are altered. Hence, the effect on the primary budget balance may be muted. However, to the extent higher productivity growth is not matched by a corresponding increase in real interest rates debt dynamics will be favourably affected. Such an effect is particularly likely for individual countries participating in a monetary union since the general structure of interest rates is unlikely to be strongly affected by structural reform in an individual country while at the same time higher growth may lead to a narrowing of risk premia.

Conclusions

Overall, the link between economic growth and the post-crisis debt overhang is complicated. On one hand, high debt seems to be associated with lower growth. But, on the other hand, fiscal consolidation may weaken growth both in the near term and over a longer horizon. Realistically, debt problems are so serious in many countries that consolidation has the potential to hamper growth strongly.

In the short run, consolidation may weaken demand and monetary policy may not be able to compensate for such effects for some time to come. This argues for phasing in consolidation. Appropriate and clear fiscal objectives together with institutions that ensure accountability may help to preserve credibility in the process. However, to maintain credibility it may also be necessary to take some action up-front, in which case instruments with small short-term multipliers may be given some weight. This may involve some political economy risk, to the extent it skews consolidation towards inappropriate instruments. Slow consolidation may also entail a price insofar as it involves higher debt and thereby higher interest rates.

In the longer run, effects of consolidation on growth will depend on the choice of instruments. Some instruments are available that will have limited detrimental impacts on growth and little or no conflict with other policy objectives. Notably, increasing spending efficiency, reforming unsustainable pension systems, putting prices on environmental externalities and maximizing the benefits of structural reforms could make sizeable contributions to consolidation. In addition, reviewing tax and benefit systems more generally could help identify how policy objectives could be achieved at a lower cost and where support is less justified.

Appendix 5.1

Fiscal Gaps

The underlying model used to calculate fiscal gaps is deliberately simple (Merola and Sutherland, 2011). It builds on the assumptions underlying the *Economic Outlook* medium-term baseline on potential output growth, output gaps, interest and inflation rates until 2025. Between 2025 and 2050, GDP growth is determined by the growth rate of potential, which is driven by demographic developments and assumptions about productivity growth. The fiscal side of the model assumes that revenues adjusted for the cycle remain a constant share of GDP and, in the baseline, primary spending is also a constant share of GDP.

For any long-run fiscal projections, GDP growth, interest rates and inflation together with the fiscal assumptions determine long-run sustainability (Appendix Table). In the country models the main assumptions are as follows:

- GDP growth in the long term is driven by potential output. One of the main components of potential output that is varying over time is working age population growth, which is based on cohort data from long-term demographic projections. GDP growth is then determined by participation rates and employment and labour productivity growth. The latter is assumed to converge to 1.75 per cent by 2035 at the latest. The simulations ignore possible impacts of fiscal policy and debt developments on output.
- Interest rates on government borrowing are partly determined by monetary policy. The return of output to potential is accompanied by a normalization of interest rates, such that the risk-free rate is at its estimated natural rate by 2025. Inflation converges to the monetary authorities' target, typically 2 per cent annually. Interest payments are determined by the stock of debt and an interest rate that is based on a mix of long- and short-term rates, with the long-term rate including a premium of 4 basis points for each percentage point of financial liabilities in excess of 75 per cent of GDP. Japan is assumed to remain unusual, with the very high share of domestic financing keeping the risk premium at only 1 basis point for each percentage point of financial liabilities in excess of 75 per cent of GDP.
- The other major assumptions concern fiscal policy. In the baseline, underlying revenues and primary spending are constant as shares of GDP, though the automatic stabilizers operate while the economy moves back to potential. In some scenarios, ageing-related spending is added to underlying spending to highlight the fiscal pressures coming from population ageing. For health care, given that only a relatively small portion of the projected increase is ageing related, additional spending is phased in linearly over the projection horizon.

The fiscal gaps are distinct from recent work by the OECD that has assessed the consolidation requirements to stabilize debt (OECD, 2011c). These requirements are based on stylized assumptions about a sustained gradual annual tightening of the underlying primary balance by 0.5 per cent of GDP until debt stabilization is reached. The fiscal gaps on the other hand make the alternative stylized assumption that the tightening will be implemented immediately and sustained until 2050 to meet a specific debt target. Both sets of assumptions ignore the implications for output, which will obviously be important.

Overall the two approaches produce similar rankings of consolidation needs across countries (Figure 5.1.1). The two approaches differ in three ways. First the time path of consolidation is different. Second, the final debt level is different. Third, the time horizon is different. The first and third differences in particular pull in opposite directions for the two approaches. The combined effect of the differences leads to the additional tightening to bring debt down to 50 per cent of GDP in 2050 being typically not much greater than the gradual fiscal tightening needed after 2012 to stabilize debt levels. In general, the immediate consolidation assumed by the fiscal gap calculations is sufficient to bring debt dynamics under control more quickly which combined with the assumption that the fiscal tightening is permanent over a longer time horizon will see debt levels gradually fall for the rest of the simulation. The estimates of the amount of consolidation needed to stabilize debt are particularly large for the United States and Japan and the gradual tightening takes considerably longer to stabilize debt. As a higher interest premium for each percentage point of debt above 75 per cent of GDP is assumed for the United States than Japan, the consequences of the gradual tightening for adverse debt dynamics are more severe, which explains why the relationship with the fiscal gap estimates differs from the other countries. If countries do not need to consolidate to meet the terminal debt target, such as in the case of Sweden, no fiscal gap is calculated and the country is excluded from the figure.

Table 5.1.1: Key Assumptions in the Baseline Simulation

| Countries | Starting point, 2012 | | Average over simulation | |
|----------------|----------------------|--------------------------------------|-------------------------|--------------------|
| | Gross debt, % of GDP | Underlying primary balance, % of GDP | Effective interest rate | Nominal GDP growth |
| Australia | 31 | 0.6 | 6.9 | 4.8 |
| Austria | 82 | 0.1 | 4.4 | 3.5 |
| Belgium | 100 | 0.9 | 4.7 | 3.8 |
| Canada | 88 | -1.8 | 4.9 | 4.2 |
| Czech Republic | 51 | 0.3 | 4.4 | 4.2 |
| Denmark | 60 | 0.8 | 5.0 | 3.5 |
| Finland | 66 | 0.8 | 4.2 | 3.9 |
| France | 100 | -0.6 | 4.1 | 3.6 |
| Germany | 87 | 0.6 | 4.3 | 3.0 |
| Greece | 159 | 3.5 | 5.5 | 3.4 |
| Hungary | 81 | 1.1 | 5.8 | 3.2 |
| Ireland | 126 | -0.4 | 4.7 | 4.3 |
| Italy | 128 | 3.3 | 4.6 | 3.1 |
| Japan | 219 | -4.2 | 3.0 | 2.2 |
| Korea | 33 | 0.5 | 5.6 | 2.4 |
| Luxembourg | 24 | 2.0 | 4.5 | 4.9 |
| Netherlands | 75 | 0.0 | 4.3 | 3.5 |
| New Zealand | 52 | -4.0 | 5.8 | 4.3 |

| Countries | Starting point, 2012 | | Average over simulation | |
|-----------------|----------------------|--------------------------------------|-------------------------|--------------------|
| | Gross debt, % of GDP | Underlying primary balance, % of GDP | Effective interest rate | Nominal GDP growth |
| Portugal | 116 | 3.5 | 4.6 | 3.1 |
| Slovak Republic | 51 | -1.7 | 5.1 | 2.8 |
| Spain | 75 | 0.5 | 4.2 | 3.5 |
| Sweden | 41 | 2.6 | 4.7 | 4.0 |
| Switzerland | 37 | 1.2 | 2.9 | 2.9 |
| United Kingdom | 93 | -3.0 | 4.6 | 4.1 |
| United States | 107 | -5.8 | 4.6 | 4.3 |

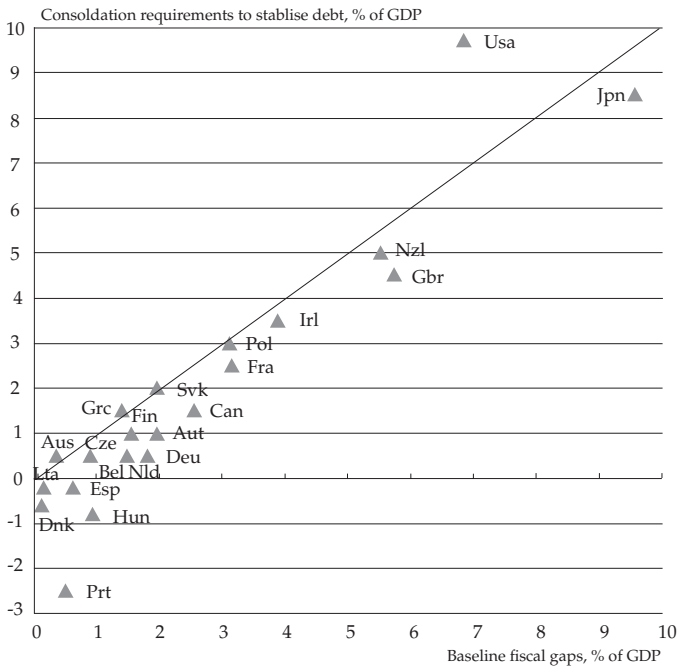


Figure 5.1.1: Relation between Fiscal Gaps and Consolidation Requirements

Source: OECD (2011c), *OECD Economic Outlook* 89.

Endnotes

- ¹ The views expressed in this chapter are those of the authors and do not necessarily represent those of the OECD or its member countries. Secretarial assistance is gratefully acknowledged from Lyn Urmston.
- ² Following a severe economic dislocation, estimating potential output and, thereby, the underlying primary balance represents a challenge. While the fiscal gap simulations do not directly assess uncertainties about potential output, the variety of simulations reported below reveal how varying different parameters affect the fiscal gap calculations.
- ³ The pension projections are based on OECD (2011a). For Greece and Spain, estimates of the impact of reforms in 2010 and a change in the law in 2011, respectively, are used. For the United States, estimates from CBO (2011) are used. For most European countries, public sector occupational schemes are included. This is not the case for Canada and Japan. The path of projected public pension spending is phased in so that the spending profile follows the profile of the old-age dependency ratio.
- ⁴ In earlier periods of very high debt, overhangs were worked off by rapid growth, primary balances and negative real returns, helped in some cases by financial repression (see below). For example, Hall and Sargent (2010) estimate that the debt reduction as a per cent of GDP in the United States between 1945 and 1974 was mainly the result of high growth and primary surpluses with about one-fifth of the reduction stemming from negative real returns due principally to high inflation.
- ⁵ Aizenman and Marion (2009) show for the United States that the maturity structure of publicly held debt is shorter than in the post-war period, reducing the incentive to use inflation to reduce the debt overhang. On the other hand, a larger share of debt is held by foreigners, which pulls in the opposite direction.
- ⁶ Financial repression includes directed lending to government by captive domestic lenders, caps on interest rates, regulation of cross-border capital movements and a tighter connection between government and the operation of banks.
- ⁷ In Netherlands and Switzerland, however, taxable imputed rentals are very low, which combined with mortgage interest deductibility act to reduce personal income tax revenues significantly.
- ⁸ In most countries, property taxes are a main source of finance for sub-national governments, posing potentially challenging fiscal federalism problems should national property taxes be introduced or raised.

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Financial Stability and Responsive Monetary Policy

Resolving a Dynamic Incompatibility

Benjamin M. Friedman¹

In the wake of the 2007–09 financial crisis a narrative has emerged, especially for the US, that poses a new challenge to the joint conduct of monetary policy and financial regulation. This chapter places much of the blame for the crisis, and therefore the economic costs that the aftermath of the crisis inflicted (and continues to inflict) not just in the US but elsewhere around the world as well, on the easy monetary policy that US Federal Reserve System pursued during the early years of that decade.²

In brief, the cause-and-effect sequence posited by this reasoning is that the Federal Reserve set short-term interest rates at historically low levels, in an effort to stimulate economic activity and thereby avert a perceived threat of deflation; that low short-term interest rates spurred investors to seek higher rates of return, for some (mostly individuals) by investing in assets such as houses and for others (mostly institutions) by lending to finance such investments; that this debt-financed investment bid up the prices of houses and other assets, at first in the usual way but in time also via a bubble-like dynamic in which both the investments and the loans behind them made sense only on the assumption of yet further asset price increases; that after the prices of houses and other assets reached levels sufficiently out of line with fundamental economic criteria the bubble proved unsustainable and asset prices started to fall; that without the rising prices the investors who had borrowed to finance their purchases of these assets could

no longer either service or refinance their obligations, especially for home mortgages; that borrowers' defaults on these obligations, and even more so the mere prospect of further defaults, caused the value of securitized claims against them to fall; and that banks and other highly leveraged financial institutions owned enough of these obligations and claims, and were sufficiently impaired by their decline in value, that a financial crisis ensued. Further, the response to the crisis by the Federal Reserve together with other central banks intended both to resist the consequent decline in economic activity and to help preserve the integrity of leading financial institutions, was once again to lower short-term interest rates, in the event, to a level below what, under this reasoning, had started the perverse cumulative dynamic in the first place.

It is not obvious that this chapter, including in particular the blame it places on the Federal Reserve's maintaining low short-term interest rates earlier in the decade, is fully persuasive. Most immediately, the link it assumes between low short-term interest rates and the subsequent bubble in house prices seems plausible enough on its face but nonetheless lacks more substantive empirical support. Neither for the US nor for other countries that experienced extraordinary increases in house prices during the pre-crisis years have researchers yet found evidence of a direct link of this form.³ Nonetheless, this narrative, together with the assumed primary causation that it attaches to monetary policy, is now a central part of the discussion on the crisis and of what policymakers should do differently in the future to avoid further such experiences.

To the extent that it therefore does have force for the current public discussion, this monetary policy-centred chapter bears interesting implications for economic policymaking on at least three grounds. To begin, under this logic the initial impetus that led to the crisis was easy monetary policy. The more familiar story is that what triggers a financial crisis is tight monetary policy: the central bank raises short-term interest rates, which increases banks' funding costs and also causes the prices of longer-lived assets, including not just houses but equities and especially bonds, to decline. In the monetary policy-

centred narrative of the 2007–09 crisis, the standard logic is reversed: the asset price decline was a reversal of overshooting attributed in the first instance to low short-term interest rates. Moreover, even in the later years immediately preceding the onset of the crisis, there was no significant move toward a tight policy on the Federal Reserve's part. The target federal funds rate peaked at 5.25 per cent, from July 2006 through July 2007; with price inflation averaging 3 per cent per annum from mid 2006 to mid-2007, this interest rate level hardly constituted tight monetary policy. And the Federal Reserve quickly backed away from even this modest interest rate increase once indications of strain in the home mortgage market appeared. By year end 2007, the target federal funds rate was back down to 4 per cent. By May 2008, it was just 2 per cent.

Second, this narrative of the 2007–09 crisis suggests the prospect of an explosive monetary policy dynamic. To repeat, under this logic the root cause of the crisis was low short-term interest rates. But once a crisis emerged, and thereafter through the resulting period of weakness in real economic activity, most central banks followed the conventional approach of a return to easy monetary policy – again in the form of low short-term interest rates. After the failure of Lehman in September 2008, and the failure-but-for-bailout of many of America's other leading financial institutions, Federal Reserve lowered the target federal funds rate to 1 per cent. By year end 2008, the target rate was effectively zero, where it has remained through the remaining six months of the recession and (as of the time of writing) two-and-a-half years of post-recession recovery. Beyond that, the Federal Reserve has publicly pledged to maintain the target federal funds rate at effectively zero for at least another three years.

From the perspective of this narrative of the crisis, therefore, the amplitude of the interest rate swing is widening. During the period of low interest rates to which this reasoning attributes the crisis in the first place, the lowest level at which the Federal Reserve set the target federal funds rate was 1 per cent, and for just one year (from July 2003 through June 2004). In response to the events to which this narrative claims that the earlier policy gave rise to, the target level went to zero,

and for 6 years (from December 2008 through, on promise, December 2014). Were it not for the zero lower bound, the downside amplitude of the swing would presumably have widened even further. Conventional empirical estimates of the Federal Reserve's systematic setting of the target federal funds rate in response to variables such as inflation, unemployment and the gap between actual and potential economic output indicate that the rate chosen in the aftermath of the crisis (and, under many estimates of this relationship, still today) would have reached *minus* 5 to 6 per cent.⁴

Third, and most important for purposes of thinking about future economic policy arrangements, the logic underlying this monetary policy-centred narrative of how the 2007–09 crisis came about suggests a fundamental incompatibility among three elements that are conventionally seen as essential underpinnings of the modern economic/financial policy structure:

- a responsive monetary policy that actively resists more-than-trivial price inflation, and that may actively resist fluctuations in real economic activity as well (for this purpose whether the central bank describes its policy framework as inflation targeting or an American-style dual mandate, or something in between, is irrelevant⁵),
- an intermediation system built on banks and other deposit-type institutions with significantly levered balance sheets, and with substantial freedom both to invest in a wide variety of financial assets and to finance those assets with mismatched (normally shorter-duration) liabilities, and
- asset markets characterized by open entry, free trading, and few restrictions on how nonfinancial investors finance their positions.

According to the monetary policy-based narrative of the 2007–09 crisis, each of these three elements was visibly at work facilitating one or more steps along the way. But each of the three also currently stands as an essential part of the standard conception of the modern free enterprise economy. If the three in combination are systematically prone to deliver the harmful consequences that the crisis bore, or even

to render an economy plausibly vulnerable to such consequences, then perhaps that conception warrants changing. If so, the question is which element(s) need(s) to change and how.

Restrict the Responsiveness of Monetary Policy? No

Discussions of 'activist' monetary policy inevitably trigger images from the half-century-old debate over what many economists of that time called 'fine tuning.' The argument made then had two components. First, in the presence of uncertainty over not just the disturbances to which the economy is subject but also the magnitude and timing of the economic impact of whatever measures policymakers might take in response, actions intended to stabilize the economy might end up destabilizing it. In a classic early paper along these lines, Milton Friedman famously showed that (under specific conditions) a policy aimed at fully offsetting economic shocks would instead amplify them if the correlation between the intended effect of such actions and their actual effect were less than one-half.⁶ Absent confidence that the achievable correlation would be this great, therefore, a 'do nothing' policy would be superior, on average over time, to a policy aiming to offset shocks fully.

Secondly, given the setting in which this debate arose, in the early decades following World War II, the implicit assumption was what policymakers were seeking to stabilize - real economic activity: output, or employment (perhaps unemployment), or both. The concern, therefore, was that this kind of 'fine tuning' would distract attention from the need to maintain stability in prices or in the rate of inflation. No one (at least to my knowledge) used the derogatory phrase 'fine tuning' to refer to attempts to resist either actual or incipient price inflation. Similarly, later on, once many central banks began using monetary aggregate targets as formal guidelines for monetary policy, no one argued that attempting to keep the money stock (however measured) as close as possible to the targeted trajectory constituted 'fine tuning.'

Both these lines of argument have merit, but neither is persuasive in the modern context. Milton Friedman's famous result about the dangers of a policy intended to offset fully any given shock to the economy was just that: an analysis of what happens if policymakers try to offset shocks fully. In another classic paper a decade and a half later, William Brainard implicitly showed that while a correlation of less than one-half between the actual and intended effect of policy action rendered a 'do nothing' policy superior on average to attempting to offset shocks in full, the 'do nothing' policy would not necessarily be superior to a more conservative policy that aimed to offset the same shock only partially.⁷ Brainard showed that as long as there was any positive correlation at all between the actual and intended effect of the policy action, under the conditions posited by Friedman there necessarily existed some activist policy that would be superior to the 'do nothing' policy.

Moreover, a logically prior – and, from the perspective of monetary economics, deeper – problem was how to define the 'do nothing' policy in the first place. Given the setting of the early postwar years, especially in the US, one might have supposed that 'doing nothing' meant holding the short-term nominal interest rate unchanged; that, after all, is what the Federal Reserve System was required to do before the 1951 Treasury-Federal Reserve Accord. But economists and others who made the anti-'fine tuning' argument certainly did not intend a return to interest rate pegging. Those who, like Milton Friedman, were closely interested in monetary policymaking instead had in mind defining the 'do nothing' policy as maintaining an unchanging rate of growth of one or another deposit-monetary aggregate, or perhaps the monetary base (central bank liabilities). As a result, once the empirical relationship between monetary aggregates and either prices or nominal income broke down in most industrialized economies, in the 1970s and 1980s, the argument along these lines became empty for practical purposes because no one could say what the 'do nothing' policy was. (Some economists interested more in the theory of monetary policy than in actual policymaking continued to think along these lines, defining the 'do nothing' policy as maintaining an unchanging rate

of price inflation; but this conception has nothing to say about what a central bank should actually do.)

The concern that what ‘fine tuning’ meant in practice implied neglect of, or at least inadequate attention to, the price dimension of aggregate economic activity among the central bank’s objectives had more lasting force. Regardless of one’s view of the origins of the ‘Great Inflation’ of the 1970s and early 1980s – whether the root cause was a flawed model of the macroeconomy (such as the stable Phillips curve), or perverse economic institutions (indexed wage contracts, for example), or a series of extraordinary supply shocks (oil, anchovies, etc.), or, more likely, some combination – it is clear in retrospect that once inflation reached levels that both policymakers and the public regarded as problematic, policymakers did not fix the problem because they did not attach sufficient priority to it.

Once they did, monetary policy conducted mostly along conventional principles, albeit involving extraordinarily high nominal interest rates, proved predictably able to reduce inflation to acceptable rates. Moreover, the real economic costs of doing so – costs in terms of reduced output and employment, and foregone incomes and profits – were also approximately in line with the predictions of previously existing conventional economic models. For more than a quarter-century since then, economic policy, importantly including monetary policy centred around active variation of short-term interest rates, has kept price inflation well within acceptable bounds in most of the world’s industrialized economies. And, until the 2007–09 financial crisis, in most countries this combination of economic policies achieved that success without large-scale fluctuations in real economic activity either.

To be explicit, this macro-economic success was based on an actively responsive monetary policy under which central banks raised short-term interest rates when the inflation rate rose or economic activity surged, or both, and conversely lowered short-term interest rates when the inflation rate fell too low (which in most countries meant a threat of deflation) or economic activity ebbed, or both.⁸ What made the difference, compared to prior experience, was attaching adequate

priority to keeping inflation low. Adopting what an earlier generation of economists had conceived as a 'do nothing' policy was not part of the recipe. At least based on past experience, therefore, abandoning this kind of actively responsive monetary policy would presumably imply significant cost.

This conclusion need not preclude generalizing the responsive approach to monetary policymaking, however – most obviously, by broadening the set of observed economic phenomena to which the central bank responds – and in the wake of the 2007–09 crisis two such generalizations seem at least potentially constructive. First, evidence for the United States shows that observations of the financial condition of individual banks (based on, for example, the criteria included in the standard CAMELS ratings), when aggregated, contain incremental information that helps predict fluctuations in aggregate-level economic activity.⁹ There is at least an *a priori* case, therefore, that the central bank's systematically responding to these observations in its setting of short-term interest rates, presumably reducing interest rates when banks' measured soundness erodes (not because banks' condition is *per se* an objective of monetary policy, but rather for the information value it contains) may improve the aggregate-level performance achieved by monetary policy. Whether such a policy change would be likely to achieve a quantitatively significant improvement in macro-economic performance would be a useful subject for empirically grounded research. (The author is unaware of any such research undertaken till date).

Secondly, in the wake of the recent financial crisis it is also plausible that a central bank might take account of not only asset prices, most obviously house prices but perhaps also equity prices, in its setting of short-term interest rates. Some empirical work for the US, evaluating the consequences of adding a term in house prices to the Federal Reserve's historically estimated interest rate-setting rule, indicates potential improvement across some range of strength of the response to house prices, relative to the historically estimated responses to inflation, the output gap and the lagged interest rate level, and under a variety of different objective functions for

evaluating the success of monetary policy at the aggregate level.¹⁰ In light of the historical pattern of variation in house prices, however, such results are inevitably highly dependent on what amounts to a single observation: the large price run-up in the years before the 2007–09 crisis and the subsequent decline. (Here again, it is important to distinguish an interest rate response to house price movements based on their incremental information with respect to conventional objectives of monetary policy, like overall price inflation and the level of real output, from an interest rate response meant to affect house price movements *per se*; to repeat, the existing evidence of an effect of interest rates on house prices is modest at best, certainly smaller than what the standard user-cost-of-capital theory would imply¹¹).

The idea of the central bank's varying short-term interest rates in response to equity prices is much older. It was at least implicit in much of James Tobin's work, which made a central point of arguing that the effect of monetary policy depended not just on short – or even long-term interest rates but on the rate of return on equities (or, equivalently, the ratio of equity prices to the comparable cost of building new capital) as well.¹² Some observers of US monetary policy in the Greenspan era claimed that the Federal Reserve did systematically vary short-term interest rates in response to fluctuations in the stock market – the so-called 'Greenspan put.'¹³ (Here too, the evidence indicates that this element of the variation of short-term interest rates was a response to the incremental information content of stock prices, not an independent attempt to target stock prices *per se*¹⁴). For purposes of this discussion, however, the issue is not whether central banks do, or did, vary short-term interest rates in response to equity price movements but whether doing so would enable monetary policy to achieve superior performance over time. Before the crisis, the consensus view, articulated most prominently by Ben Bernanke and Mark Gertler was that doing so would be unlikely to enhance macroeconomic performance.¹⁵ More recent work, however, has not only established a firmer theoretical basis for a response of monetary policy to financial asset prices but also provided some limited evidence that such a response would be likely to help the central bank to achieve its

macro-economic objectives.¹⁶ Empirical support for this claim remains limited, however, and so this subject too is a useful focus for research.

The central point, however, is that with or without the addition of a systematic response to house prices and/or equity prices, the idea that central banks might back away from the active responsiveness that has characterized the conduct of monetary policy in most industrialized countries over the past quarter-century and more holds out little attraction. Whether the objective is to achieve price stability and maximum sustainable employment, or to focus more narrowly on inflation, the outcome has been generally favourable. If this way of conducting monetary policy is incompatible with a highly leveraged intermediation system and free trading in asset markets, along the lines that the monetary policy-centred narrative of the 2007–09 crisis suggests, the better resolution to this incompatibility lies in making some change to one or another, or even both, of those two elements in the triad.

Whether the low short-term interest rate that the Federal Reserve chose to implement during much of 2003 and 2004 constituted a mistake in hindsight depends on whether the threat of deflation was as serious as policymakers then took it to be; yet another empirical question. But given that policymakers did take this threat seriously, the policy action that ensued was not a mistake *ex ante*. Similarly, it is of course possible that the low level of short-term interest rates (and, in some countries, the accompanying large-scale purchases of assets) currently being implemented by the world's major central banks may turn out in hindsight to have been a mistake, but on the available evidence it too is not a mistake *ex ante*.

Tightening Financial Intermediary Capital Requirements? Yes

The second feature of the modern economic and financial landscape that was clearly at work in the monetary policy-centred narrative of the 2007–09 financial crisis is the highly leveraged position of many of the major economies' most important deposit and lending institutions.

There is no surprise in the fact that financial intermediaries have leveraged balance sheets. The essential function of a financial *intermediary* is to stand between depositors who demand ready liquidity for their funds and borrowers who seek funds for purposes with payout streams that cannot support liquid liabilities. Issuing liquid liabilities and relending in illiquid form are inherent to its economic purpose. In addition, in light of the key role that financial intermediaries normally play in the economy's payments mechanism, it is essential that the deposits they issue, and by extension their other liabilities as well, be extremely reliable. By contrast, many of the uses to which their borrowers apply funds are inherently risky even apart from the time profile of the hoped-for returns. Hence, the transformation that financial intermediaries undertake involves both liquidity and risk.

This said, there is nothing in the underlying fundamentals to necessitate that intermediaries' leverage be of any given magnitude, much less what many important institutions maintained in the period leading up to the 2007–09 crisis. In the United States, most of the largest commercial banks had leverage ranging from twelve to fifteen-to-one. Many of the major investment banks had leverage of 25 to 30-to-one, and some even higher. Moreover, even these reported leverage ratios were in many cases understatements because of assets and/or liabilities held off a firm's balance sheet. Lehman's infamous 'Repo 105' (which would not have been allowed if the transactions had been booked in the US) temporarily removed some \$50 billion from the firm's balance sheet at every quarter end.

Given the liquidity and risk transformation that is essential to financial intermediaries' economic function, together with the basic implications of limited liability under which almost all major firms do business, there is a natural need in this area of economic activity for public policy instruments such as capital requirements, supervision and regulation, and deposit insurance. Nearly all economically developed countries have these instruments, and for some applications (the most obvious example is the Basel capital standards process) international coordination has evolved to overcome the potential shortcomings of imposing different rules in different jurisdictions.

But the 2007–09 crisis dramatically demonstrated that the regulations and other protective devices then in place were inadequate to restrain institutions from business decisions that subjected not only their shareowners but also the economy at large to substantial costs, and exposed their countries' taxpayers to potential losses as well. The leading example in the United States, and perhaps more broadly, was Citibank. By mid 2008, well before Lehman failed and what had been mounting strain in key markets turned into an out-and-out crisis, Citi had taken losses of \$55 billion, mostly on its portfolio of mortgage-backed securities including collateralized debt obligations backed by subprime and other mortgages.¹⁷ The bank actually held most of these assets through separately structured entities from which in principle it could simply have walked away, as Bear Stearns did when it let one of its sponsored hedge funds collapse in the summer of 2007 (in what became the first concrete sign that a crisis might be coming). But Citi had apparently marketed claims against these special purpose vehicles as if the bank stood behind them, and it was unwilling to accept the reputational damage that would therefore have followed from letting investors take the losses. If its large depositors had withdrawn their funds in the same way that Bear Stearns's short-term creditors had (the limit on deposit insurance in the US was then \$1,00,000 per account), the bank would have been ruined just as Bear Stearns was.

Citi, therefore, took the assets back from the off-balance-sheet entities and absorbed the losses itself. Without direct assistance from the US Government, the bank would presumably have failed. Citi received \$45 billion in direct capital infusions under the Treasury's Troubled Asset Relief Program (TARP) and Targeted Investment Program (TIP), which made the government, by far, the bank's largest shareowner (after the Treasury converted the initial \$25 billion of preferred stock that it received into common, it held 33.6 per cent of Citigroup common stock¹⁸); the Treasury and the Federal Deposit Insurance Corporation together guaranteed the value of more than \$300 billion of the bank's remaining assets; and the Federal Deposit Insurance Corporation (FDIC) further guaranteed new debt issued by Citi (along with that of

all other US banks). Even so, by early 2009 Citigroup stock had fallen to just 97 cents per share, from \$55 as recently as late 2006.

Citi was not the only example. The US government had to rescue several other major American financial institutions as well: most prominently Bank of America, which also received \$45 billion in direct capital infusions, and insurance company AIG, which set the all-time bail-out record at \$182 billion and became almost entirely government-owned. Nor was the phenomenon of banks running themselves into the ground and looking to government for rescue limited to the US. UBS took \$38 billion in losses on its portfolio of mortgage-backed securities and related derivatives. In October 2008, the Swiss government rescued the bank by setting up a classic 'bad bank,' the Stab Fund, into which the Swiss National Bank put \$40 billion.¹⁹ Royal Bank of Scotland took \$15 billion in losses; UK government rescued it, taking an 82 per cent ownership share in the process, also in October 2008. In March 2009, the French government bailed out BNP Paribas, the largest French bank with an E5 billion loan. Just last year France, Belgium and Luxembourg joined in issuing E90 billion of guarantees to rescue Dexia, a bank owned by interests in those three countries, and the Belgian government bought the bank's Belgian division for E4 billion. And there were others as well.

It is difficult to escape the conclusion that these losses, and the consequent government bail-outs that ensued, were the result of excessive risk-taking by the banks' managements. Here again, Citi is the easiest example at which to look – in this case through public statements made both before and after the fact by one of Citi's most senior executives. In the spring of 2007, William Rhodes, at the time senior vice chairman of Citigroup and chairman of Citibank, wrote in the 'Financial Times' that 'pockets of excess' were developing in the US financial system and pointed to the housing and mortgage markets in particular. 'I believe,' Rhodes wrote, 'that over the next 12 months a market contraction will occur and this time it will be a real correction.' It was therefore 'the time to exercise greater prudence in lending and in investing and to resist any temptation to relax standards.'²⁰ In a book published soon after the crisis, however, Rhodes acknowledged

that the bank's management chose not to act accordingly.²¹ Moreover, the 2007–09 episode was hardly unique in Citi's experience. In the early 1990s, the bank was probably insolvent after its real estate and leveraged-buy-out portfolios suffered major losses. In the early 1980s, the bank was in a similar situation after many of the Latin American and other developing countries to which it had lent defaulted on their obligations.

The reason is not hard to infer. The asymmetric payout structures inherent in limited liability create incentives even for the shareowners of a firm to undertake investments that they would consider excessively risky were they operating as an unlimited partnership. The prospect of taxpayer-financed bail-outs further skews the incentives that bank shareowners face. Perhaps the most distorted incentives, however, operate at the level of management, not the shareowners. To cite once again the case of Citigroup, owners of stock in the bank before the crisis have done poorly, whether they sold along the way or not. But the bank's managers, especially those who had only modest stock holdings, did well. In the spring of 2009, for example, soon after receiving the government's \$45 billion capital infusion, the bank paid out \$2 billion in bonuses, including payments of more than \$5 million apiece to forty-four individuals, for work done in 2008; a year in which shareowners lost 95 per cent of their value.²²

The conclusion this experience supports is not only that self-regulation of financial institutions and financial markets failed but that the body of regulatory arrangements imposed by government was inadequate as well. Public discussion since the crisis has taken this conclusion goes in two directions. The one that bears on leverage is to call for increased capital requirements for banks and other financial institutions, especially those deemed systemically important on account of size, or 'interconnectedness,' or both. Given the potential drawbacks of imbalances in such requirements across different countries, much of the effort along these lines is currently embodied in the process designed to lead to internationally agreed 'Basel III' minimum capital requirements. If these requirements go forward as currently discussed, many major financial institutions, especially in

Europe, will need to increase their capital or reduce their holdings of risk-rated assets. In the United States the Federal Reserve Board is proceeding on a parallel track, including an overall 'leverage ratio' limit and, for the largest institutions, a 'liquidity ratio' test (in both cases mirroring the in-process Basel III discussions).

It is premature to judge the likely efficacy of these more onerous restrictions on bank asset-liability management, and not just because the intended effective date of the Basel III agreement is not until 2019. Much of what matters in this context is not just the numerically stated minimum capital requirements but the accounting standards that designate against what collection of assets or liabilities the requirements apply. The failure-but-for-bail-out of Citibank, for example, was due almost entirely to losses that the bank took on assets it was holding off of its balance sheet and, therefore, against which it was required to hold no capital at all, regardless of the stated ratios for on-balance-sheet assets. Here too, Citi was not unique.

Critics of the call for greater capital requirements point to a likely decline in banks' ability to lend in support of economic expansion. With a limited amount of bank capital, it follows straightforwardly that balance sheets must be smaller under higher required capital ratios and smaller permitted leverage. Further, as long as government-issued obligations continue to carry a lighter risk weighting than private obligations, the more limited lending that banks can then do will also be more skewed toward supporting government needs rather than those of businesses or households. (In an era of stubbornly outsized government borrowing, this concern carries particular force). But there is no reason that the supply of capital to banks needs to be strictly limited as this line of argument assumes. Over time, the higher rate of return implied by greater scarcity of bank capital is likely to increase the supply of it, and therefore to support bank balance sheet expansion beyond what a mechanical application of higher capital ratios to an unchanged aggregate quantity of capital would imply.

The aspect of this criticism that does withstand scrutiny is that the new equilibrium under stricter capital requirements therefore involves not only a larger quantity of bank capital but also a higher

rate of return on it, that higher rate of return will correspondingly imply higher interest rates, all else being equal, on bank lending (and perhaps lower interest rates on bank deposits too). But these higher interest rates will merely cause bank borrowers (and, if they receive lower rates, the depositors), who are the ultimate economic beneficiaries of the intermediation the banks are providing, to internalize the cost of the systemic risk to which the intermediation from which they are benefiting potentially subjects the economy. Some of those borrowers will remain as borrowers from banks, but at higher cost. Others will exit the banking system, either finding the funds they need (also presumably at higher cost) elsewhere or doing without. For both groups, the fundamental matter is the removal of a public subsidy and the correction of an externality: with inadequate capital requirements, as at present and in the recent past, the availability of taxpayer-financed bail-outs constitutes a subsidy to intermediation, and the exposure of the economy more generally to the loss of incomes and profits in the event of crisis constitutes a negative externality (as the 2007–09 crisis showed, potentially a very large one). Seen from this perspective, stricter capital requirements would merely reduce (in the limit, eliminate) the subsidy and offset the negative externality. On both grounds, the economic effect would be positive.

Within the specific context of the monetary policy-centred narrative of the 2007–09 crisis, and the implications for monetary policy in particular, under stricter capital requirements low short-term interest rates maintained by the central bank, even over an extended period of time, might still make banks eager to seek higher returns in riskier assets but would limit their exposure to potential failure if the investments through which they sought to do so turned out badly. From a broader economic perspective, higher capital requirements would remove the subsidy that taxpayers now provide to bank lending, and would also cause banks (and those who borrow from them) to internalize at least part of the negative externality that bank risk taking now imposes on taxpayers and on the economy at large. Both outcomes would be worthwhile.

Restrict Trading in Asset Markets? Yes, but Only in a Targeted Way

A second major initiative along similar lines, also triggered by the 2007–09 crisis, and particularly in the United States, is reducing the scope of commercial banks to engage in speculative trading unrelated to their intermediation role. It is difficult today to realize that until as recently as 1999, US financial institutions operated under a separation of commercial banking (defined as taking deposits and making loans) and investment and trading in privately issued securities. In the most recent period, the industry-wide presumption has instead been that banks cannot operate without universal trading functions.

That presumption, however, rests on either or both of two claims. One is the presence of direct synergies between intermediation and trading. The other is that trading is a systematic source of profit that banks will then use to subsidize their lending. Neither claim withstands scrutiny. There is little or no empirical evidence of synergies between banks' lending and trading functions, and the crisis demolished any idea that banks' trading of securities is systematically profitable. (It is profitable except when it isn't; and when it isn't, banks look to government to make up their losses.) Moreover, even if banks' trading activities were systematically profitable, it is not clear as to why they would channel those profits to subsidize their lending, in other words, to subsidize the borrowers, rather than charging borrowers market-equilibrium interest rates and either explicitly or implicitly returning the trading profits to shareowners.

As with the Basel-based effort to impose stricter capital requirements, however, it is likewise premature to judge what will emerge from the current effort to limit banks' securities trading. In the United States, in principle Congress has imposed a version of the 'Volcker rule' that does exactly this. But while the 2010 Dodd-Frank legislation opened the way for these and other reforms, it left much of the actual decision making to independent regulatory agencies such as the Federal Reserve Board, the FDIC, the Securities and Exchange Commission, and the Commodity Futures Trading Commission.

As of the time of writing, some 350 separate rule-making exercises are currently underway.²³ The situation in many other countries is analogous, though in most cases less complicated.

What about securities trading by firms other than banks? Any case for such restrictions outside the banking system would have to face a steeper hurdle. What makes banks' assumption of risks different from that of other investors is the combination of their high leverage and the role they play in the intermediation and payments systems. The collapse of the 'dot-com' bubble, at the end of the 1990s, is a useful counter-example. Then too, investors in many of the Western economies suffered major losses. In US alone, the peak-to-trough decline in equity values was nearly \$9 trillion.²⁴ But because the securities that lost value were mostly held outside the banking system, the resulting impact on economic activity was small. There was certainly no sense of a financial crisis. Losses absorbed by pension funds, mutual fund shareowners and other such investors are not welcome, to be sure, but they do not have the same impact as losses that erode the limited capital position of leveraged intermediaries that are essential to the transfer of funds from savers to borrowers and maintaining the payments mechanism.

Moreover, there is a long-standing presumption that the open character of markets in which securities are issued and traded has served the industrialized Western economies, and again especially the US, well over time. These countries' free enterprise economies, in which saving is both mobilized and also allocated to specific investment applications mostly by private transactions in decentralized markets, have achieved long-term growth records far superior to what any attempt at central planning has been able to deliver. Recently, some economies that rely more heavily on government guidance for these purposes, most obviously China, have achieved even more impressive growth rates over a period now measured in decades (in China's case, since soon after the reforms instituted by Deng Xiao-ping beginning in 1978). But there is a difference between catch up growth, in which an economy with average productivity and per capita income far below the economic leaders can exploit technologies developed elsewhere

and also take advantage of its low relative labour cost, and growth at the frontier. Even after three decades of rapid growth, China's per capita income is just one-fifth of that in the large European economies, and only one-seventh of that in the US, in comparable prices.²⁵ It is far from clear that China, under its current economic system (and, still more so, under the country's current political system), will be able to maintain its rapid growth as Chinese income and productivity draw closer to those in the industrialized West.

Even so, today there is increasing reason, on several grounds, to wonder whether the lack of restriction on entry and trading in securities markets is serving the Western economies well.²⁶ One, by now, familiar concern, to repeat but now in a different context, is again the consequent potential exposure to occasional costly disruption in real economic activity. Whether under the monetary policy-centred narrative of the 2007–09 crisis or some different account that attaches less importance to the period of low short-term interest rates earlier in that decade, an essential element in what happened in the most recent episode was surely the run-up in house prices and accompanying surge in home construction spurred in part by the low interest rate on residential mortgage lending – importantly including lending to what were, even *ex ante*, questionable credits. If the funds behind those loans had come solely from the banking system, this element too would have been merely another failure by the banks. But in this instance the loans were largely securitized, which means that the pricing reflected, in great part, the decisions of the non-bank investors that bought the securities.

A second ground for concern is the increasing evidence of misallocation of the economy's investment (which is the real counterpart to financial bubbles): too many now empty houses built in the years before the 2007–09 crisis, when house prices were increasing so rapidly; too much never-lit fibre-optic cable laid during the dot-com bubble, when the prices of telecom stocks were shooting up; and similar wasting of resources in previous episodes as well. Allocating the economy's scarce capital stock is the essential role of the private financial sector in a free enterprise capitalist economy.

Well-established public utility models exist for operating the payments mechanism, providing liquid deposit instruments and vehicles for retirement saving, providing life and casualty insurance, and most of the other functions that the financial sector in a modern economy also carries out. By contrast, the force of the lopsided comparison between the long-term performance of the free enterprise economies and what has repeatedly ensued under central planning is to demonstrate the superior allocation of investment that decentralized private markets achieve. The idea that those markets may instead misallocate investment in a major way therefore goes to the heart of the argument.

And a third now familiar concern is the large cost of running this capital allocation mechanism, especially when that cost is measured as a share of the total economic return earned on the capital being allocated. The aspect of this cost that has received the greatest attention in recent years is the large and increasing share of the economy's profits – in the United States, 34 per cent on average in the years just before the 2007–09 crisis – that accrues to firms in the financial sector. But the relevant total for this purpose includes all of these firms' operating expenses as well: salaries, bonuses and other personnel costs; office rents, rental equivalents for owner-occupied buildings, and other real estate costs; utilities and maintenance; travel; advertising; and all the other costs that go into running any modern service-sector business.

What gives these latter two concerns added force is the widespread sense, in many of the Western economies, that capital formation in aggregate is likely to be limited for the foreseeable future and also (paradoxically, since scarcity normally implies a higher return) that this period is likely to be one of only modest asset returns compared to historical norms. Aggregate capital formation is likely to be limited both by the continuing need of households and intermediaries to deleverage, following the excesses of the pre-crisis period and then the damage that the crisis inflicted on their balance sheets, and also by ongoing fiscal imbalances that will force government borrowing to continue to absorb a large share of private saving in many economies. The reasoning underlying the prospect of modest returns is more diffuse, but the expectation is widely shared nonetheless.

Both limited aggregate investment and the prospect of modest returns render these concerns about the functioning of the Western economies' capital allocation mechanism more acute. If investment in the aggregate is likely to be limited, then misallocating the investment that an economy is able to undertake becomes a more noticeable waste of resources. For just the same reasoning, dissipating what is invested by devoting it to the process of running the allocation mechanism – to point to the most readily visible example, using scarce resources to construct office buildings to be occupied by banks and other financial firms – is likewise more costly.²⁷

Similarly, if the overall return to the economy's invested capital is low, then any given amount taken off the top by the firms that perform the allocation function leaves less for ultimate savers and investors. Especially in economies like the United States, where the average return earned by equity market investors over the past decade and a half has already been historically low, this prospect raises the concern that a new generation of potential investors may conclude that investing in equities is not worth the risk, or even that attempting to save is not worth the foregone consumption.²⁸

The need to balance these more recent concerns against the long-standing presumption of superior allocation of capital by markets characterized by free trading in securities and other assets precludes any sharp conclusion in favour of radical restrictions. Two steps seem warranted, however. One, already emphasized in the context of the monetary policy-centred narrative of the 2007–09 crisis, is to bar banks and financial intermediaries, in so far as is possible, from trading activities not inherently relating to their lending. The clear benefit of doing so would be to make one of the key steps in the dynamic posited by this narrative (and not challenged more generally) less likely: the impairment of the economy's intermediation system, and perhaps even the payment mechanism too, as a result of losses incurred by banks and other key intermediaries. As the experience of the dot-com bubble demonstrated, equivalent losses are less damaging when they accrue outside the banking system.

The second step would be to impose restrictions more broadly

on those trading activities that add to market price dynamics but do not contribute to the capital allocation process. The most obvious current example is high-speed trading. It is difficult to believe that the economy's ability to allocate its scarce capital resources is improved by resolving departures of securities prices from their correct values (on the benign assumption that this is what is taking place) in one nanosecond rather than three. It is still less plausible that systematically placing large volumes of orders, but then cancelling most of them before the market maker's less-advanced electronic capability can execute them, improves capital allocation. Yet these are currently among the most profitable, and large-scale, sources of securities trading today.

A modest per-transaction tax, too small to be meaningful (or even noticeable) to investors whose decisions do matter for allocating the economy's capital, would render such activities unprofitable. The benefit of such a tax would not be to raise revenue but rather to eliminate one form of off-the-top drain against the limited return on the economy's capital, and to hence leave more of that return to be distributed to investors whose decisions matter for this fundamental economic purpose.²⁹ In the United States, member firms of the New York Stock Exchange have traditionally operated under restrictions that prevent them from gaining a communications advantage (to the floor of the Exchange) over other traders. The case for preventing non-member securities firms from exploiting a similar kind of technological advantage is analogous.

Both of these steps are sharply limited. In parallel, however, a highly useful initiative for economic research, though certainly not yet for policy action, would be to explore more broadly which components of today's securities trading add economic value in the sense of plausibly enhancing the economy's capital allocation mechanism. The question is a large one, and neither the conceptual basis nor the empirical tools for addressing it are currently in place. But by proceeding on a piecemeal basis, rather than attempting to evaluate the economy's capital allocation mechanism as a whole, it should be possible to make useful progress. For example, what would have been different, not just in the latest episode but in recent

experience more broadly, if the US economy had not had a market in collateralized debt obligations? Much of the public discussion in the wake of the crisis simply assumes that it is impossible to go back to a world without mortgage securitization. But Americans built and bought houses, and owned and lived in them, long before securitization appeared. Indeed, the American home-ownership rate was among the world's highest before anyone thought to securitize the first mortgage. Does having a market for collateralized debt obligations (CDO) generate benefits to the economy – by mobilizing additional saving, for example, or by facilitating a more efficient allocation of investment – that exceed the accompanying risk? The question can be asked for many other institutions and markets as well.

Conclusion

The narrative of the 2007–09 financial crisis that assigns a primary causal role to the low short-term interest rates that central banks, especially the Federal Reserve System but others as well, maintained earlier in that decade poses a major challenge for monetary policymaking under the existing institutional arrangements in many countries. Some elements of this account of the crisis are unquestionably valid, while the empirical support for others remains weak. But the account overall has sufficient support and likelihood of merit, to be taken seriously. It has already fostered significant criticism of the steps that many central banks have taken in the post-crisis period, including in particular a new and already even more protracted period of low short-term interest rates.

A key implication of this narrative is that the combination of (1) monetary policy centred on an active response of short-term interest rates to observed and anticipated movements in price inflation and perhaps also in real economic activity, (2) highly leveraged banks and other financial intermediaries, and (3) open trading in asset markets by investors including banks and other intermediaries but other categories of investors too is potentially inconsistent with financial stability. On the evidence of the recent crisis and its aftermath, this narrative also raises the possibility that these three familiar features

of the modern economy, in combination, create the makings of a potentially explosive monetary policy dynamic in the sense of swings of increasing amplitude in short-term interest rates at business cycle frequencies.

The conclusion argued in this chapter is, in the first instance, that the right policy response to this incompatibility is *not* to curtail the active responsiveness of monetary policy. (There is some ground to argue for expanding the set of dimensions of economic policy to which monetary policy actively responds, to include asset prices and especially house prices; but from this perspective that is a second-order issue.) The gains achieved over the past quarter-century by this way of conducting monetary policy are too important to forego. To the extent that this trio of features of the modern economic and financial system is inconsistent with financial stability, and may threaten an explosive monetary policy cycle, the way to resolve the impasse is by addressing the other two elements.

Secondly, both on this ground and for other reasons as well, there is a strong case for limiting the leverage of banks and other financial intermediaries – that is, for requiring them to hold more capital in relation to the size of their balance sheets. Movements to do so are now underway via the Basel process, as well as in many countries individually. They merit support. To be effective, however, enhanced capital requirements also imply parallel reforms to financial-institution accounting. What matter for this purpose are not just the stated ratios but the precisely defined collections of assets or liabilities to which they apply.

Thirdly, in the wake of the crisis there is also ground for limiting some forms of securities trading, by some categories of investors. The strongest case is for barring banks from private securities trading not directly related to their lending activities. (Even with stricter capital requirements, banks and similar intermediaries will still inevitably operate with significant leverage.) There is also a good case for limiting some forms of securities trading by other investors – such as high-speed trading, which in some economies accounts for a large and increasing share of all trading done – for example, by a small per-transaction tax

that would be negligible from the perspective of investors engaged in other kinds of trading.

Finally, the economics profession, including not just academic researchers but also agencies within respective countries' statistical apparatus, and together with policy institutions like their central banks, should undertake a program of empirical and conceptual research to explore how well the existing financial market structures are performing their fundamental economic functions, and at what cost, and whether there is reason to conclude that different institutional structures would better serve their economies. Making policy decisions effectively requires having an adequate knowledge base in place first. Sponsoring research to establish a sufficient basis for taking decisions is, therefore, also a part of the policymaking process.

Endnotes

- ¹ This chapter was prepared for the Reserve Bank of India's Second International Research Conference, on 'Monetary Policy, Sovereign Debt and Financial Stability: The New Trilemma,' Mumbai, February 1–2, 2012. I am grateful to numerous colleagues, especially Kenneth Kuttner and Richard Mattione, for helpful conversations.
- ² An early critic along these lines was John Taylor; see, for example, Taylor (2007, 2008). For other supporting views, see Jarocinski et al. (2008), Ioannidou et al. (2009), Ahrend (2010), Kahn (2010) and Maddaloni and Peydro (2010).
- ³ For a review of the pertinent evidence, see Kuttner (forthcoming).
- ⁴ See, for example, Rudebusch (2009, 2010).
- ⁵ Whether this difference matters in a more general context is subject to debate. A striking aspect of the 2007–09 crisis and its aftermath was the similarity in actions taken by central banks with sharply different policy mandates: for example, the Bank of England (an explicit inflation targeting mandate), the European Central Bank (a price-stability-first mandate), and the Federal Reserve System (a dual mandate assigning equal importance to price stability and maximum sustainable employment). One interpretation of events is that these differences in central bank mandate matter for monetary policy under ordinary circumstance but not in a crisis. Another interpretation is that they matter for rhetorical purposes but not for what central banks actually do. The subject is ripe for serious empirical research.

- ⁶ Friedman (1953).
- ⁷ Brainard (1967).
- ⁸ The central bank's active response to movements in real economic activity in this way does not necessarily mean that real activity is *per se* an objective of monetary policy. Such a response would be warranted even if the inflation rate were the sole argument of the central bank's policy maxim and, as long as observed movements in real activity reflect incremental information about future (or at least not yet observed) movements of inflation, which the evidence for most economies indicates that they do.
- ⁹ See Peek et al. (2003a, 2003b). In the US bank supervisory system, an individual bank's CAMELS rating is based on the examiners' assessment of its *capital adequacy, asset quality, management, earnings, liquidity* and sensitivity to market risk.
- ¹⁰ See Lo (2010). For related evidence for Norway, see Akram and Oyvind Eitrheim (2008).
- ¹¹ See again Kuttner (forthcoming).
- ¹² See, for example, Tobin (1961, 1963).
- ¹³ See, for example, Rigobon and Sack (2003).
- ¹⁴ See Fuhrer and Tootell, (2008).
- ¹⁵ Bernanke and Gertler (1999, 2001). See also Cecchetti et al. (2000).
- ¹⁶ Curdia and Woodford (2009), for example, laid out a model in which financial frictions, including the kind of phenomena that figured importantly in the 2007–09 crisis, create the basis for a systematic monetary response to the prices of financial assets. For empirical exercises offering some support for this proposition, see Grossi and Tamborini (2011) and Gambacorta and Signoretti (2011). See Kuttner (2012) for a useful review of the available evidence overall.
- ¹⁷ *The Economist*, August 7, 2008.
- ¹⁸ U.S. Treasury (2011), p. 31.
- ¹⁹ Zimmermann and Seyles, (2010). See also the Swiss National Bank's 2009 *Accountability Report*, section 6.5, and the 2010 *Accountability Report*, section 6.7.
- ²⁰ Rhodes (2007).
- ²¹ Rhodes (2011).
- ²² *New York Times*, July 30, 2009.
- ²³ See Kroszner and Shiller (2011) for an assessment of Dodd-Frank and views on useful further steps.

- ²⁴ This magnitude is based on quarter-end values (2000:Q1 to 2003:Q1). The peak-to-trough decline on a daily basis would be greater.
- ²⁵ World Bank, *World Development Report 2011*, Table 1. (Data are for 2009.)
- ²⁶ For a fuller account of the first three arguments that follow, see Friedman (2010).
- ²⁷ A parallel argument applies to the use of so much of the economy's most valuable labour in the financial sector; see Friedman (forthcoming).
- ²⁸ The latter part of this argument is a familiar one, but its conceptual basis is less sound because it rests on the assumption of a positive interest elasticity of saving. Because of the opposing income and substitution effects, the (uncompensated) interest elasticity of saving is of indeterminate sign *a priori*, and for most countries over recent decades the available empirical evidence is not able to determine the sign either.
- ²⁹ A parallel benefit would be to free up the extremely talented people who currently work in high-speed trading to do something else that might add economic value; see again Friedman (forthcoming).

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Credit Crises and the Shortcomings of Traditional Policy Responses

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Introduction

The objective of this chapter is to investigate the origins of the current economic and financial crisis, the worst since the Great Depression, and to draw two policy lessons. The first of these has to do with policies to extricate ourselves from the current global crisis. Virtually all of the policies followed to date, while supportive of growth in the short term, seem likely to make current difficulties more intractable over time. The second has to do with the policy changes required to avoid similar problems in the future. In effect, a new 'macro-financial' stability framework to do this is needed.

The underlying thesis of the chapter is that the global economy has been on an unsustainable path for many years. Inevitably, the end of the road has been reached. Fundamental policy changes are now required, relying much more on supply-side reforms than simple demand-side stimulus. Accepting this conclusion also demands a different way of thinking about how domestic macroeconomies work and about the requirements for a stable international monetary system.

The Surprising End of the 'Great Moderation'

The 'Great Moderation' refers to almost three decades of unusually good macroeconomic performance in the Advanced Market Economies (AMEs) which preceded the onset of crisis in August 2007. The onset of the crisis was a highly non-linear event, and for most

policymakers (and others) came as a complete surprise. Moreover, as the crisis deepened and widened, 'denial' was the normal response. First said to be confined to the subprime mortgage sector in the US,² it was then said to be only a liquidity crisis,³ then a solvency crisis but confined to the financial system, and only much later was it accepted that it would have significant implications for aggregate demand and unemployment worldwide.⁴ Moreover, the associated need for supply side adjustments, that will affect unemployment for a long time, is still not being adequately recognized.

Why this surprise and associated denial? For those in the private sector making huge profits, there was no inclination to question the source of these profits. Similarly, finance ministries were satisfied to receive (and generally spend) the associated tax receipts which they judged to be 'structural' rather than cyclical.⁵ As for central bankers, who were single minded in their focus on price stability, prices were in fact stable. Thus, it was concluded that all was well, and indeed would continue to be well.

Above all, however, the surprise was due to an analytical failure.⁶ The macroeconomic models used by academics had no room for crises of this kind. Indeed, lasting deviations from full employment were ruled out by assumption.⁷ As for the larger and more structural models used by central banks, the IMF and the OECD, they were generally constructed to ensure that very bad outcomes could be offset by good policy. All of the models in common use essentially assume linearity, have either no or very primitive financial sectors, and focus on 'flows' of expenditures rather than the build up of 'stocks' (especially of debt) over time. Since it is this stock element that ultimately leads to non-linear outcomes, it is not surprising that the models missed it.

The fact that policymakers' analytical frameworks did not include the possibility of crises had many undesirable implications. Not only was the crisis not forecast, but no steps were taken to prevent it in advance. Moreover, no *ex ante* measures were taken to allow the crisis to be better managed when it did arrive. Consider, for example, that in the United Kingdom prior to the crisis there was no adequate deposit insurance, no special bank insolvency legislation, and inadequate

arrangements for inter-agency cooperation during the crisis. At the international level, the shortcomings were even worse, not least with respect to the problems of winding down systemically important financial institutions with global reach.

Misdiagnosis of the severity of the underlying problem also led to inappropriate policy conclusions which have already had important political implications. For example, the fact that the Democratic Party in the US lost control of the House of Representatives in 2010 seemed to reflect the popular belief that President Obama should have been focusing 'like a laser' on the economy. Instead, presumably advised that the policy measures already taken would lead to a 'typical' recovery, he subsequently pursued a quite different policy agenda focussed on health care and climate change.⁸ Similarly, in Europe the governments in the peripheral countries most affected by the sovereign debt crisis have all been replaced and right wing movements in many countries are in the ascendant. In this regard, the 1920s in Central Europe provide lessons that should not be forgotten.

The Underlying Causes of the Crisis

There are two schools of thought on this. One might be designated the more comforting school of 'what is different'. The other could be called the less comforting school of 'what is the same'.⁹ At the beginning of the crisis, the former school held sway, but more recently the second school has been in ascendance. This is appropriate. While both schools are right, the latter school is more important than the former.

The school of 'what is different' essentially blames the crisis on the use of new and untested financial instruments or procedures.¹⁰ This would include the rise of a shadow banking system (Special Investment Vehicles conduits and the like), extensions of the originate-to-distribute model, structured products and the expanded role of rating agencies. On the one hand, this school is more comforting because it provides all of those involved in the governance process (internal management, risk committees, supervisors, central bankers and a host of others) with a convenient excuse; namely, that no one confronted with such new ways of doing things could have been expected to foresee the

dangers and exposures they might bring in train. On the other hand, this school of thought does put regulatory failures directly in the firing line. The 'hands off' approach of the Federal Reserve under Chairman Greenspan, and the 'light touch' of the Financial Stability Authority (FSA) in the United Kingdom, have more recently (and rightly) been the subject of widespread criticism.

The school of 'what is the same' is inherently even less comforting. It begins by noting that there had been financial and economic crises from time immemorial; 1825, 1874, 1929, 1990 and 1997 to name just a few.¹¹ Moreover, while each had its idiosyncratic components (*e.g.*, the credit card was invented in the US in the 1920s), basically they all look much the same. Some piece of good news (new technology, new discoveries etc.) leads to justified optimism and an extension of credit. This flows into the real economy, boosting spending, and into asset prices, boosting collateral. Both factors boost confidence and lead to more lending, leverage and speculation. Over time, lending standards decline and the quality of loans becomes ever more doubtful.

It seems that this process can end either with a sharp rise in inflation, or an economic or financial crisis of some kind. In the case of a crisis, whether it starts on the real side (less corporate or consumer spending due to high debt levels) or on the financial side (overleveraged lenders cutback) is not so important.¹² What is important is that the real and financial sectors interact both on the way up and on the way down. It is that interaction between stock imbalances that further contributes to the non-linearity of this 'boom-bust' process.

Those responsible for oversight of the economic and financial system over recent decades must find this school of thought less comforting. Against the backdrop of history, most failed to see the evidence that history was repeating itself.¹³ In the years preceding the crisis, credit and monetary expansion were at very high rates, lending standards were deteriorating, spreads were at record lows for both high risk and emerging market sovereign borrowers, and the price of getting insurance for bad financial outturns had never been so low.¹⁴ In addition, asset prices (especially of housing) were rising rapidly and spending patterns in many countries gave clear evidence of excess.

Household saving rates fell to zero or even much less in many English speaking countries, while fixed investment rose to over 40 per cent of GDP in China. These patterns (increasingly referred to as 'imbalances') should have been seen as unsustainable.

In addition, there were disquieting developments on the supply side of the global economy ('malinvestments' in the parlance of the Austrian school of economics).¹⁵ A number of industries expanded rapidly and ratios of value added to GDP rose to unprecedented levels. For example, in Spain construction-related activities peaked at 18 per cent of GDP while in US the profits of the financial services sector rose to 40 per cent of all profits. Still more importantly, the export capacity of South East Asia expanded rapidly, even as important segments of their export markets became ever more burdened with debt — both internal and external. The idea that these trends might actually have to be reversed, to reflect problems of declining profitability, is still inadequately appreciated.

The role of monetary policy in the AMEs leading up to the crisis needs special attention. Policy rates in Japan, US and the Euro area were respectively, 0, 1 and 2 per cent in the spring of 2003. Casual observation reveals an inflection point at that time in almost all of the data series just referred to.¹⁶ Further, some financial specialists have contended that many of the financial innovations that characterized the period leading up to the crisis were themselves a response to the low interest rate environment. Rajan (2005) contends that many of the new instruments were consciously designed to repackage risk, so that a reasonable probability of a mildly costly event would be replaced by a much smaller possibility of a very costly event. Since most of humanity suffers from what psychologists call 'disaster myopia' this effectively made the risks disappear.

In a similar vein, many people were encouraged by mortgage originators and lenders (focussed on short-term bonuses and service charges) to believe that an increase in the price of their house was an increase in their wealth. Common sense dictates this cannot be true, since the costs of housing services had risen equivalently.¹⁷ However, the increased house price did provide collateral for borrowing, at what seemed relatively low mortgage rates, and many people gave in to the

temptation to use their houses as Automated Teller Machine (ATM) machines. Some have conjectured¹⁸ that this willingness to borrow might also have reflected a strong desire to 'keep up with the Jones's', at a time when median incomes (in the US) were stagnating and the income gap between rich and poor was rising almost everywhere.¹⁹ At the time, this borrowing and spending was welcomed (by the Fed in particular) as contributing to the 'intertemporal optimization of consumption'. Interestingly, no one at the time dwelt on the inconveniences likely to be associated with 'payback' time.²⁰

It also needs to be emphasized that interest rates were that low in the AME because they had been ratcheting down since the early 1980s. This was the result of central banks being increasingly focused on 'price stability', at a time when the opening up of China and other ex-socialist countries was putting significant downward pressure on global inflation. It is highly debatable, at the level of theory, whether this was in fact the appropriate monetary policy reaction to a series of positive supply-side shocks.²¹ Further, and a potential second form of error, the top leadership of the Federal Reserve in particular believed that it was not possible to use monetary policy to lean against the upswing of the credit cycle (the boom). Rather, they preferred to ease monetary policy aggressively to moderate the subsequent downturn (the bust). Such easing, without commensurate tightening in the upturn, began in 1987 after the stock market crash, and was then repeated in 1990, 1997, 1998 and 2001 to 2003. It could be contended that this overly easy and asymmetric policy strongly encouraged the build-up of the stock of debt which is now constraining household spending in the United States (and many other countries) going forward.²²

While the emphasis thus far has been on policy errors in the AME's, the contributing role played by Emerging Market Economies (EME's) and the International Monetary System also deserves to be emphasized. Very rapid monetary expansion in the AMEs should generally have driven down their exchange rates. This would be particularly expected in countries where high spending levels had also led to record trade and current account deficits. However, faced with the prospective appreciation of their exchange rates, many EME's

decided to resist this tendency even though they were often running large external surpluses. This applies particularly to China and other countries running 'export led growth' strategies, but also to the oil exporters as well as others.

Due to their 'fear of floating', many EMEs followed a policy of currency intervention, and often easier domestic monetary policies than would otherwise have been the case. The former policy led to a massive reserve build-up, largely in US dollars, and pushed down long rates in the US which encouraged still more debt build-up. The latter policy has led to many of the 'imbalances' in the AME's being exported to the EME's, not least, rising house prices. Moreover, it also contributed to the intensification of inflationary pressures in many of these countries. China, India and Brazil, among many others, found themselves in just such a situation in 2011. In short, the monetary factors leading up to the crisis became truly global and have by no means fully played out.

This raises the still more fundamental issue of how much longer an increasingly globalized economy can live with an International Financial System (really a non-system) that allows such outcomes. Under the gold standard, creditor nations would have been forced to spend more domestically and debtor nations would have been forced to retrench. Under Bretton Woods, the IMF tried to achieve the same outcome through surveillance. However, these efforts generally failed because the Fund had no effective influence over either creditors or the world's biggest debtor — the (then) hegemonic United States. These constraints on the IMF continue to apply. Moreover, in recent decades international debtors have been allowed to dig themselves into ever deeper holes using money freely provided by creditors.²³ This raises the particular possibility of an eventual dollar crisis (the end of the Triffen paradox²⁴) which would certainly have unpleasant implications for everyone, creditors as well as debtors.

The current European crisis, which has very similar roots,²⁵ may be a portent of what is yet to come on a global scale. Just as China imported an inappropriately expansionary monetary policy from the United States, the debtor peripheral countries in the Euro area imported

an inappropriately expansionary monetary policy from Germany. Perhaps even more important, in the run up to the introduction of the euro and for almost a decade afterwards, creditor banks (largely banks in Germany and France) lent unprecedented amounts at declining interest rate spreads to debtor countries.²⁶ This allowed the peripheral European countries to run up large external deficits and associated debts.

Because there could be no nominal exchange rate adjustments within the Eurozone, such loans were thought 'risk free'. Only more recently has it become widely understood that the decline in exchange rate risk was being offset by an increase in counterparty risk.²⁷ The unfortunate characteristic of the latter risk is that perceptions of credit worthiness can and have changed quite suddenly.²⁸ This suddenness has been exacerbated by the crucial role played by European banks in the intermediation process. Excessive debts in peripheral countries (both public and private) are now thought to threaten the survival of banking systems, not only in peripheral countries, but in core creditor countries as well. Given such potentially non-linear interactions, market confidence has become extremely fragile and another 'Minsky moment' has become all too possible.²⁹ This explains the extreme efforts made over the last few months to restore market confidence in Europe, both in systemically important banks and in sovereigns.

Policy Responses to Date and Their Shortcomings

Recently, a number of scholarly studies have examined historical data to identify the key characteristics of the recovery phase after economic downturns accompanied by a financial crisis.³⁰ The principal conclusion of these studies is that such recessions are generally unusually severe and protracted. Unemployment rates generally are still above pre-crisis levels ten years later, while house prices remain below pre-crisis levels. Household saving rates rise sharply while investment falls commensurately, and government deficits and exports rise to satisfy the National Income Accounts identity. Even after ten years, the process of deleveraging is often ongoing. Generally speaking, the

severity of the downturn is closely linked to the size of the debt build up (often proxied by a debt to GDP ratio) in the period preceding the crisis.

What evidence is there that 'This Time Is Different'? Sadly, the answer is, not much. It is now almost 4 years since the crisis began and almost every day some new manifestation of the underlying difficulties emerges. While the fate of the Eurozone was the centre of global attention for most of 2011, virtually every major geographical area also provided some legitimate cause for concern. This is largely due to the fact that the various imbalances, identified as triggering the crisis, are essentially still intact. In particular, the process of deleveraging of non-financial private sector debt has in fact hardly begun,³¹ and to this has been added a 'new' problem of sovereign debt.³² Perhaps more ominously, the increase in the ratio of credit to GDP was significantly higher in the build-up to this crisis than the average build-up in the various crises identified in the historical studies.³³ Further, to the extent that exchange rate depreciation and increased exports were agents in previous recoveries for individual countries, this seems less likely when a large number of countries have been affected simultaneously, as is currently the case.

Could public policies (in particular monetary and fiscal stimulus) make a material difference? It is important to note that this issue was the essence of the debate which took place between Hayek and Keynes in the early 1930s.³⁴ Hayek's view at the time was that the downturn was the inevitable result of the excesses of the preceding period, and should be allowed to run its course. Activism would only make things worse. Albeit, he did admit much later that 'secondary depressions', which built on themselves, should be resisted.³⁵ Keynes took the view that policy, particularly fiscal policy, could be effective and should be used to combat 'Deep Slumps'. As it is known, Keynes' views prevailed and became the standard textbook model for undergraduates in the post War period.³⁶ However, the fact that Keynes would have supported the use of monetary and fiscal easing as a habitual response to slight downturns and even prospective downturns, as opposed to 'Deep Slumps', seems highly unlikely.³⁷

There have been echoes of the Keynes–Hayek debate in recent discussions about the effectiveness of stimulative monetary and fiscal policies in the AMEs. The authorities in the US and UK initially seemed much more in the Keynesian camp, resorting to massive monetary and fiscal stimulus,³⁸ while the central Europeans seemed to have some residual sympathy with Hayek. As a result, the European Central Bank (ECB) lagged significantly in easing monetary policy, while initial fiscal stimulus tended to be smaller and of shorter duration.³⁹ Subsequently, the ECB briefly raised the policy rate as the European economy began to improve while both the Fed and the Bank of England failed to do so in quite similar circumstances.

Over the last few months, against the backdrop of the European crisis, many European countries have intensified their fiscal restraint, and some have introduced ‘debt brakes’ to ensure longer run discipline.⁴⁰ In contrast, the US administration has proposed more fiscal expansion in the short term along with a plan for controlling the growth of sovereign debt only over time. Due to political differences in Congress, neither of these proposals has in fact been acted upon.

In addition to having analytical roots, these biases (for and against macroeconomic stimulus) also reflect differences in historical experiences.⁴¹ For the US, the defining historical moment was the Great Depression, whereas for the Europeans it was the hyperinflation of the 1920s. Further, Europeans have a better social security system, implying they are more prepared than many others (including the US and China) to accept the economic and social costs of economic downturns. For completeness, it should be noted that the Japanese authorities appear divided among themselves. Evidently, the Ministry of Finance has signed on to Keynesian prescriptions, whereas the Bank of Japan seems more ‘Austrian’ in its focus on the processes that led to the Japanese bust in the first place.⁴²

Differences of view among countries as to basic objectives and risks are not without consequences. In addition to helping undermine international cooperation more generally, a topic discussed subsequently, such differences could have important implications for exchange rates and other markets. Recall how the perception of a US–

German divide on interest rate policy contributed to the stock market crash of October 1987. Much more recently, perceptions of policy divisions among the major countries of the Eurozone have contributed significantly to the funding difficulties experienced by many European sovereigns and European banks.

The Effectiveness of Monetary Policy

The view of the Federal Reserve over the last few decades has been that monetary policy can be effective in restoring aggregate demand. Moreover, it has advanced plausible arguments to support this view. However, it is also not hard to construct counterarguments.⁴³ The first argument is that the economic models currently in use all indicate that policy can be effective. The counterargument, implicitly raised above, is that models are not reality. Second, it is argued that easing has always worked to stimulate the economy in the past. The counterargument, again implicit above, is that each bout of easing has had to be more vigorous than the preceding one, precisely because of the 'headwinds' of accumulating debt induced by lower rates. In the end, easing might well cease to work at all. Thirdly, when asked to look at the actual experience of Deep Slumps (in particular the US Great Depression and the more recent Great Recession in Japan), the Fed's view seems to be that they were a by product of policy error.⁴⁴ The authorities were not Keynesian enough. The counterargument relies on the much richer spectrum of historical experiences referred to above. Should one believe that there was policy error in every case? Or, rather, should one conclude that all these deep downturns were in large part shaped by the common experience of a credit bubble prior to the crisis?

Finally, there is the awkward fact that policy rates in the AMEs are effectively at zero and can be lowered no further. The Fed's response (and presumably that of the Bank of England) is that Quantitative Easing (changing the size of the central bank's balance sheet) and/or Credit Easing (changing the composition of the central bank's balance sheet) will work to stimulate spending. These are largely untested propositions given the lack of historical experience with their use.⁴⁵ Moreover, the fact that different central banks often seem

to believe different things about how these processes might work is not encouraging. The ECB, for example, sees its 'non-standard' policy measures, not as monetary policy at all, but as a means of restoring market functioning so that standard measures (low policy rates) can be transmitted to the real economy more effectively.⁴⁶

In addition, not only do some of the suggested channels seem to conflict with what has been accepted wisdom for many years.⁴⁷ but it has also been suggested that they might actually prove counterproductive. Bill Gross (2011), for example, contends that policies directed to reducing term premia might reduce the supply of loans for longer-term investments. Others have rather focussed on the distributional implications of very low interest rates. If creditors (who suffer) have higher marginal propensities to spend than debtors (who benefit) then spending overall might be reduced. A similar conclusion is suggested if consumers target a desired level of cumulative saving; say, to purchase an annuity on retirement.⁴⁸ Then, a lower 'roll up rate' requires more saving, not less.

Even if it is accepted that ultra-low interest rates and non-standard measures (quantitative and credit easing) will eventually stimulate spending, one must also ask at what cost. First, could the result be yet another in the series of bubbles that have been experienced so far? Recent developments in the EMEs have been referred to and could be just such a bubble. Second, while helpful for recapitalizing banks (who play the yield spread), very low rates penalize insurance companies, pension funds and other forms of saving.⁴⁹ This could contribute to more risk taking and eventually more financial instability.

Thirdly, the crisis is already estimated by the OECD to have lowered the level of potential in the AMEs by an average of three percentage points. By lowering saving, and encouraging the survival of 'zombie' companies and 'zombie' banks, potential could be lowered even further. Indeed, evidence is accumulating that this has been an important element explaining Japan's secular stagnation.⁵⁰

Finally, there is concern that exceptionally easy monetary policy might in the end lead to a sharp increase in inflation. As noted, this was a real threat in many EMEs in 2011, but could it also be a problem

in AMEs as well? For those, like the Fed, who focus on the domestic output 'gap' as the driver of inflation, such an outcome seems almost impossible. Yet, an 'irrational' increase in inflationary expectations cannot be ruled out. One possible trigger might be a sharp decline in the value of the dollar, whose inflationary effects would be compounded if, at the same time, the prices of imported goods (in foreign currency) were rising.⁵¹ Another possible trigger might be concern about the potential monetization of large government deficits.⁵² This kind of phenomena was seen in Latin America over decades, and the historical studies referred to above also indicate that inflationary outcomes often follow burst bubbles, when government debt levels tend to rise sharply.⁵³ It also needs to be emphasized that, in a world where both prospective demand and prospective supply are subject to unusual uncertainties, policy misjudgements can by no means be ruled out.⁵⁴

The Effectiveness of Fiscal Policy

A number of traditional arguments can be put forward to support the idea that discretionary fiscal expansion is an effective way to support economic recovery. As with monetary policy, however, counterarguments are not hard to find.⁵⁵ First, some would support the use of fiscal expansion on the grounds that fiscal multipliers are relatively large. The counterargument is that the empirical evidence to support this proposition is mixed,⁵⁶ and that theory in recent decades (especially the concept of Ricardian Equivalence) actually points in the opposite direction. To add to the confusion, multipliers might differ across countries depending on how open the economy is, and how attentive taxpayers are to growing government liabilities.⁵⁷ Second, it has been contended that discretionary policy can be made more effective if 'timely, temporary and targeted'. Unfortunately, each of these propositions conflicts with what conventional wisdom over the last two decades has deemed to be either practical or appropriate.⁵⁸ Third, it has also been argued that resolute discretionary action to resist the downturn and encourage recovery will increase investor confidence in a self fulfilling spiral of lower interest rates (due to lower risk premia) and more private spending. The counterargument is that the resulting

increases in debt levels will destroy confidence, prompting either a sovereign credit crisis or a currency crisis, or perhaps both. Evidently, this last line of reasoning not only argues against more discretionary easing, but could even be used to question the desirability of allowing automatic stabilizers to work fully.

This third argument about the effects on market confidence is crucial. Moreover, it is still the subject of vigorous debate, especially in Europe. Over the last few years, historical evidence has been produced to support both propositions with the outcomes largely dependent on market perceptions of the longer run costs associated with fiscal expansion. These longer run costs (of fiscal expansion) have much to do with starting conditions. Countries with initially high debt levels run a greater risk of an adverse market response to higher deficits and still more debt. Initial conditions must also take account of off-balance sheet liabilities. In many countries, a worsening demographic profile implies that fiscal stability is already threatened by rising expenditures on pensions and medical care for the aged. Contingent liabilities of sovereign governments (say to recapitalize exposed banks) are another source of concern.

At the present juncture, even the official liabilities of many of the AMEs imply a government debt to gross national product (GNP) ratio that is set to rise forever on the basis of current policies.⁵⁹ Evidently, this cannot happen, but the question is how the 'unsustainable' might be stopped? Will it be through an orderly and sustained application of fiscal discipline, or in a more disorderly way including recourse to much higher inflation? What is sure is that the magnitude of the 'swing' in the primary surplus required to stabilize the debt to GDP ratio is very large.⁶⁰ Indeed, while subject to significant uncertainty, it has been estimated to be over ten percentage points of GDP in Japan, UK, US and Ireland.⁶¹

The desirability of further fiscal stimulus looks even less clear when one factors in the hypothesis that sovereign debt levels, above a threshold of around 80 to 90 per cent of GDP, might further reduce potential growth.⁶² Most AMEs are either at that threshold already or are very close. Cutbacks in desirable government expenditures (say

bridge maintenance), higher risk premia in financial markets, and lower investment by those confronted with (or even fearing) higher taxes could all play a role⁶³ in explaining this phenomenon.

In sum, there are important risks on both sides. On the one hand, letting government debt levels expand further could have significant costs, not least a catastrophic loss of market confidence. On the other hand, preventing such expansion in the face of a private sector 'bust' after a credit fuelled 'boom' could aggravate (perhaps seriously) a downward slide in aggregate demand. As noted above, central Europeans seem more adverse to the former risk and English-speaking countries more adverse to the latter. What seems a common sense response to this trade off would be to allow public sector debt to expand in the face of private sector weakness, but to compensate with markedly stricter rules ('fiscal frameworks') to ensure that debt levels will be reduced in the future. However, two practical problems can stand in the way. First, there is the issue of whether the political framework to ensure future discipline is credible.⁶⁴ Second, markets might legitimately fear in some cases that, whatever governments pledge, they will in the end choose debt restructuring to the painful process of gradual deleveraging.⁶⁵ For either reason, a sudden loss of market confidence might still be possible.

The Effectiveness of Other Policies to Maintain the 'Status Quo'

Governments have been very active in two other domains as well. Significant steps have been taken to support the financial system in the AMEs. Moreover, government subsidies of various sorts have been used to support employment and also whole industrial sectors. As with the macro policies just discussed, there are persuasive short-term arguments to justify what has been done. Nevertheless, these policies again have downsides from a longer term perspective. In effect, they constitute efforts to preserve a production structure that may no longer be appropriate.

To be more specific about these long-term costs, it seems generally agreed that the imprudent behaviour of bankers and many others in the financial sector contributed materially to the magnitude of the crisis.⁶⁶ Significant financial reform, rather than maintenance of the

status quo, might then have seemed more desirable. As for support for existing jobs and traditional production sectors, this seems to fly in the face of a changing global environment. With the rise of the EMEs, and a new pattern of comparative advantage, governments of AMEs might have been better advised to encourage changes in production patterns rather than resisting them.

Consider first the financial sector. When the crisis erupted it was initially thought that there would be few implications beyond the markets for US subprime mortgages. No policy response was thus required. However, as the turmoil spread, central banks turned to various measures (many of an unprecedented nature) to restore liquidity to markets that had dried up, and to support institutions in need. Later, governments urged private recapitalizations, helped arrange mergers and acquisitions, and themselves took significant equity positions in many financial firms.

What has been remarkable about this process has been the reluctance of many governments both to nationalize financial institutions and to declare them insolvent. In effect, the crisis has continued to be treated as one of illiquidity rather than insolvency. This ‘muddling through’ stands in sharp contrast to the systematic attempt made in the Nordic countries in the early 1990s to restructure and recapitalize the industry as a whole.⁶⁷ The aversion to nationalization, particularly in the US and UK, seemed to have deep ideological roots. Further, the aversion to declaring financial institutions insolvent seemed to reflect, not only the absence of adequate legislation, but a fundamental uncertainty about what the implications of insolvency might be. This uncertainty was due largely to the size, complexity and interdependence of many of the firms in trouble (the so-called ‘too big to fail’ problem).⁶⁸ The validity of these concerns was underlined by the problems which emerged following the bankruptcy of Lehman Brothers.

This ‘muddling through’ approach did maintain a functioning financial system, which is a notable achievement. Nevertheless, it has had a number of implications. Perhaps the most important is that it is not yet clear that the financial systems in the AMEs have been fully restored to good health. Many banks (especially in Europe) have huge

maturity rollovers to deal with in 2012. Nor is it clear that capital levels are high enough to deal with still uncertain prospective losses on toxic assets, property, and particularly sovereign credit risks in Europe. As a result, a number of jurisdictions have recently taken steps to raise capital and liquidity requirements quite substantially.⁶⁹ Unfortunately, this has led to a tightening of credit conditions that could constrain growth going forward.⁷⁰ Evidently, any further easing in economic growth, or worse a 'double dip' recession, would bring still further losses.

These policies to support the financial system have had other undesirable side effects as well. First, the failure to deal with problems definitively may also have increased the unwillingness of financial institutions to lend to each other. These tendencies were likely aggravated by the prevailing uncertainty about future financial regulations. The upshot is that central banks have been drawn increasingly into the role of 'market maker of last resort'.⁷¹ Second, through mergers and acquisitions, the 'too big to fail' problem has become even more serious than it was before. Third, as a result of the involvement of central banks in the support of the financial system, issues concerning their future 'independence' have arisen in a number of countries.

It is a fact that central banks took a number of highly unusual actions during the crisis. Not only did they allow the size of their balance sheets to swell enormously, but their actions often had important distributional implications as well; which institutions and sovereigns to support and which not? Since actions with distributional implications are traditionally decided in the political realm, this poses a serious threat to the 'independence' of central banks going forward.⁷² In US, the Fed's actions have already led to calls for more oversight by Congress and more binding legislation. This threat will be further increased once it is better recognized that central banks can also choose whether to take out insurance against deflation or inflation. Evidently such a choice has enormous implications for redistribution between creditors and debtors, with highly indebted governments likely to prefer an inflationary outcome and central banks not. Again, there will be a threat to central bank 'independence.'

Finally, to the extent that 'price stability' and 'financial stability' are increasingly being seen as macro phenomena, with monetary as well as financial roots, these two objectives cannot be pursued separately.⁷³ The use of traditional monetary policy instruments, in the pursuit of price stability, affects output and prices. But so too does the use of macro-prudential tools in the pursuit of financial stability. Given this reality, there must be some joint management of all these instruments. As an example of the problem, consider what is happening in UK. A Financial Stability Committee has been established at the Bank of England, alongside the existing Monetary Policy Committee, with both to be headed by the Governor of the Bank.

However, given this new concentration of power, legislation is now being drafted to make the Bank more responsible to Parliament. To summarize, as a result of developments during the crisis, the 'independence' of central banks seems very likely to be further constrained.⁷⁴

Consider now the measures taken by governments during the crisis to support both existing jobs and industrial sectors. As to jobs, the most widespread policy has been subsidies for short-time working. These have been used most actively in the manufacturing sectors of continental Europe and Japan. The idea was to reduce layoffs, and the associated likelihood that workers might subsequently lose contact with the job market, which would push up the so-called 'Natural Rate of Unemployment'. As to the latter, perhaps the most notable example was the direct financial support provided by the US and Canadian governments for their domestic car industries. In a similar vein, programs to substitute 'cars for clunkers' were seen almost everywhere.

Policies directed to maintaining the existing production structure also have important downsides over the longer term. During the boom period, supply capacity in a number of sectors became too large relative to underlying demand. In the AMEs, financial services, retail distribution, construction, transportation (including car production) and a number of related industries grew too much. They should now be allowed to shrink, not encouraged to stay as they are. Evidently,

there will be the need for active labour market policies and retraining to help minimize the resulting problems of frictional unemployment.⁷⁵

Still more troublesome, unsustainable global trade imbalances also built up. This implies that countries with large trade surpluses should be taking steps to produce more non tradable goods and services, while countries with large trade deficits should be doing the opposite. In contrast, it is remarkable that the countries which have relied the most on short time work have generally been countries with large trade surpluses. In the specific case of China, the government used a variety of means to support export industries during the crisis (including measure to hold down the renminbi) which increases the threat that China's initial massive trade surplus could grow even bigger as a result.⁷⁶ In short, the jobs being saved in countries with large trade surpluses also seem likely to be jobs that will disappear with time.

A Possible Way Forward

The broad conclusion to be drawn from the above comments is that traditional macro-economic policies to support near term growth might not succeed in providing the 'strong, balanced and sustainable growth', to which the G20 is committed. Indeed, continuing to rely on such near term policies could make longer term prospects worse and not better. The same could be said for the other policies directed essentially to maintaining the pre-crisis production structure. What then can be done if governments can no longer rely on quick fixes?

In principle, there are ways to restore sustainable global growth even given the current, bad starting point. The policies that might be suggested are more international cooperation, more attention being paid to debt restructuring and outright debt reduction, and structural policies to raise potential growth in ways that are compatible with sustainable patterns of international trade. Absent concrete progress in implementing such policies, the danger remains that the ongoing economic and financial crisis could enter an even more destructive phase. Unfortunately, even if the political will can be found to pursue these policies, they will take considerable time to bear fruit. Whether

social and political order can be maintained in the interim thus becomes an important complementary issue.

International Cooperation

International cooperation must be premised on the understanding that creditor and debtor countries are mutually interdependent. If debtors fail to pay, because they cannot or will not, then it is the creditors that suffer the losses. Cooperation comes down to efforts to minimize the size of those losses. To this end, countries with large current account surpluses should be spending more, and those with deficits should be spending less.⁷⁷ In addition, the nominal exchange rates of creditor countries should be allowed to rise, leaning against any potentially inflationary pressures arising from more spending. This might have been of particular help to China in the last few years, when inflationary pressures were becoming worryingly strong. Resulting shifts in the terms of trade would also contribute to desired shifts in saving patterns, while the exchange rate changes in themselves would affect the demand for imports and exports such that they reduce global imbalances.

Against the backdrop of concern about renewed internal imbalances in many countries, the particular kind of spending also matters. In China, and a number of other creditor countries, there is a need to stimulate domestic consumption which is currently very low. At present, the current extraordinarily high investment levels need to be cutback, before they too culminate in a crisis of unprofitability and further reliance on already saturated foreign markets.⁷⁸ Allied with this would be deregulation of product markets in China, and most other creditor countries, to make it much more profitable to produce domestic (non-tradable) services. In United States and a number of other debtor countries, the main need is to cut consumption, allowing more room for investment in tradables. Evidently, such shifts in the pattern of production will not occur without an exchange rate incentive and without confidence that creditor countries will allow foreign made goods and services to be imported. The danger posed to global growth by a rise in protectionism is well understood. What

is less well understood is that even the fears of protectionism can be very harmful.⁷⁹

Unfortunately, there are significant impediments to achieving the degree of international cooperation required.⁸⁰ First, for the reasons discussed above, different countries often emphasize different objectives and risks in assessing their macro-economic options. Second, there still seems to be a strong 'go it alone' mentality in both the US and China. The former attitude perhaps reflects the traditional (if fading) status of US as the post War global hegemon.⁸¹ The latter, with arguably much more ancient roots, reflects a profound unwillingness (apparently broadly shared by ordinary citizens) not to be pushed around by foreigners.⁸² China's rejection of calls for a faster revaluation of the renmimbi seems to reflect such attitudes, as well as internal political pressures from State Owned Enterprises (SOEs) whose profits might well suffer.⁸³

A third impediment to more international cooperation is that a number of creditor countries, not least Germany, still have an attitude of moral superiority.⁸⁴ This leads to the suggestion that required policy adjustments should be primarily carried out by countries (like Greece, Ireland and Spain) running large trade deficits, rather than by creditor countries (like Germany and Netherlands). This threatens a more deflationary outcome in a European environment already threatened by deflation. Finally, many creditor countries with large reserve holdings in US dollars (in particular China and Japan) are perfectly aware that they are caught in a situation from which there is no easy exit. Allowing their currencies to rise could help avert a potentially more disastrous outcome over time, but only at the expense of substantial (and up front) revaluation losses on their reserve holdings.

The formal structures for achieving better international cooperation have been evolving in a desirable way, but are still not adequate to deal with the problems at hand. The increased authority of the G20 process at least brings all the principal creditors and debtors around the table. However, this recognition of the enhanced importance of the major EMEs is not yet reflected in the governance structure of the IMF. Moreover, as the global economy seemed to strengthen in

2010 and into 2011, the urgency of the G20 deliberations faded and attention shifted from crisis management to crisis prevention.⁸⁵ While the European crisis reversed this tendency, the general conclusion reached at the Cannes Summit was that this problem had to be solved in Europe. While widely recognized that a European failure in this regard could have devastating global implications,⁸⁶ this recognition was insufficient to generate offers of financial support, especially from large creditor countries.⁸⁷

Debt Reduction

If debts are unsustainably high, and/or threaten to impede recovery in many jurisdictions (as deleveraging proceeds), then a more formal process of debt reduction has many attractions. This applies to household debts in a number of countries but to sovereign debts in others. It is of course true that, for countries with large foreign debts denominated in domestic currency (US today and UK in the early 1930s), depreciation is an informal method of achieving debt reduction.⁸⁸ However, in some countries (like those in the Euro area) depreciation is not an option, and in some others (where debts have been incurred in foreign currency) depreciation would actually increase the burden of debt service.

In fact, there has been recourse to formal debt reduction and restructuring since ancient times,⁸⁹ justified not only on moral and social grounds, but also in recognition of the fact that 'half a loaf is better than no loaf'. This recognition reflects the view that delays in recognizing harsh facts (one will not be repaid in full) results in the losses being greater than otherwise. Debtors are given more time to make still more losses, or will 'gamble for resurrection' with the creditor's money. Another argument for debt reduction in the Euro area (affecting sovereign debt in particular) is that many debtor countries also became highly uncompetitive. However, using domestic deflation to restore competitiveness (in the absence of the possibility of devaluation) would only worsen those debt burdens in real terms. Thus, debt reduction would seem a necessary, if not sufficient, condition to restore sustainable growth for some peripheral countries.⁹⁰

Unfortunately, today there are many impediments to debt forgiveness. General schemes to alleviate the burden of household debt lead to worries about equity and moral hazard.⁹¹ As for individual renegotiations, the sheer scale of the problem is daunting.⁹² In the United States, around one out of five mortgages in the United States are now greater than the value of the house. The physical apparatus to renegotiate so many individual mortgages is simply not there. Moreover, given negative equity, such mortgage holders are not eligible to refinance their mortgages, as others can do, when mortgage rates fall. In addition to the scale problem, many mortgages are encumbered by second mortgages or have been wrapped up in structured products that explicitly forbid restructuring of the underlying securities. Inadequate documentation to allow legal rulings is another emerging problem, and potentially a serious one. If banks cannot prove they own a property, how can they legally foreclose on the occupants?⁹³

As for restructuring or forgiving sovereign debt, there would be serious worries about contagion (particularly in Europe) once this process began. Moreover, as is true for all forms of explicit debt reduction, some creditor must formally recognize the losses. This raises the question of whether European banks could remain solvent in such circumstances, and whether existing legislation would be adequate to allow an orderly wind down. In the limit, it also raises the question of whether the initially solvent governments of countries where such banks reside would have the fiscal resources to support their banks in such circumstances. Concerns of such a nature might help explain the initial fierce resistance of the German and French governments to suggestions of the need for debt restructuring in some of the peripheral countries in the Eurozone.⁹⁴

Structural Reform

A complementary way to make the burden of debt more bearable is to grow one's way out of it. If demand-side measures have lost their potency, then structural measures to increase potential growth are an attractive alternative. The need for this is further enhanced by the fact that the crisis itself is estimated by the OECD to have reduced the level

of potential by an average of three percentage points in the OECD area. One reason for this is that both creditor countries and debtor countries seem to have been affected by an increase in long-term unemployment and lower participation rates. Moreover, there has also been a decline in the effective capital stock due to both a higher cost of capital (via higher risk premia) and accelerated obsolescence. This latter phenomenon is related in large part to the reversal of the real 'imbalances' referred to above.

Over the years, the OECD has done a great deal of work on such issues. Their publication 'Going for Growth' provides a handy summary of much of this work⁹⁵ as it applies to labour markets, product markets, financial markets, pensions, environmental issues and many issues related to the efficient provision of government services. As well, the OECD has carried out a significant amount of research into how structural policies might be applied to reduce current account imbalances. Some of these are intended to affect the demand side of the economy (saving and investment, respectively) while others are intended to shift resources between the production of tradable and non-tradable.⁹⁶

Perhaps the suggestion closest to being a 'silver bullet' has to do with raising the effective age of retirement, particularly in countries with significant debt problems and the threat of a deep and long lasting economic downturn. The income from more work⁹⁷ would contribute to more spending, to more saving and more taxes, while reducing the burden of future pensions at the same time. Basing labour market policies on the 'active flexicurity model' would also offer great promise, especially in the peripheral countries of Europe where dual labour markets are well entrenched. The current system benefits insiders (mostly old) at the cost of outsiders (mostly young), and has contributed to the very high level of youth unemployment in Greece, Spain and Italy in particular.

Unfortunately, as with the other desirable measures discussed above, structural reforms are not easy to carry out. Those who will benefit (the many) often do not realize it. Consider, for example, the point made just above about later retirement, and recall that the protests in France in 2010 were in large part led by young people who would

benefit from such reforms.⁹⁸ In contrast, those who will lose their rents from structural reform (the few) know it very clearly and organize themselves to resist it. Further, the pain from structural reform comes up front and the gains only materialize later. In democratic societies, often populated by people with excessively high rates of time discount, political support can prove fleeting.

Conscious of the political economy aspects of such reforms, the OECD has in recent years done a great deal of research⁹⁹ into what they now call 'Making Reform Happen'. Evidently, such work has called for close collaboration between economists, political scientists, sociologists and other disciplines as well. Identified prerequisites for successful reforms include a planning process which considers sequencing, procedures to handle vested interests, and ways to tackle simultaneously the need for fiscal consolidation.¹⁰⁰ Also essential are ways to mobilize broad public support. Not least, the public must be convinced that the reforms are 'fair' and that one group of insiders is not just being replaced by another. Analysis of past reform efforts reveals that public support is most often forthcoming when all the other alternatives have been clearly exhausted. Against this background, the current crisis provides an opportunity for structural reform that should not be missed.

Moderating Future Crises

As noted by Reinhart and Rogoff (2009) and others cited above, financial and economic crises of the sort people are living through have been recurrent features of life for millennia. They have occurred under widely different monetary and regulatory regimes, and seem to have their roots in human nature.¹⁰¹ The implication would be that, while future crises might be moderated, they cannot be avoided. This leads to the conclusion that one should be taking steps in advance to moderate the associated costs of inevitable crises. Since the world is not yet out of the current crisis, it might seem odd to be so forward looking. Yet, as with structural reform more generally, the current crisis presents a political window of opportunity for financial reform. This opportunity has not yet been fully exploited. Three particular

suggestions might be made. However, each one suffers from being either analytically controversial, or politically difficult, or both. Taken together, they constitute what the author has called elsewhere a 'macrofinancial' framework for economic stability.¹⁰²

First, policy instruments should be used more actively to 'lean against the wind' during the upswing of the cycle when rational exuberance is being transformed into irrational exuberance. Agreed, it is not easy to know when to do this,¹⁰³ but the problems are not inherently more difficult than the problem of measuring the 'output gaps' which drive policy decisions today.¹⁰⁴ It is also preferable that policy instruments be determined by rules (like dynamic provisioning for example) rather than discretion, since there could be a marked reluctance for the authorities to act at times when rising asset prices give the appearance of permanent increases in wealth.¹⁰⁵ The authorities, as well as the private sector, can get caught up in the prevailing optimism.

A variety of policy instruments could be considered to help lean against the wind. There now seems general agreement on the use of regulatory (macroprudential) instruments for such purposes; provisioning, capital requirements, loan to value ratios, primary and secondary reserve requirements, etc. While there is less agreement on the use of the monetary policy rate, a debate is at least underway.¹⁰⁶ Less consideration has been given to the use of tax policy. The tax deductibility of mortgages and corporate debt clearly contributes to higher levels of indebtedness. These provisions might also be changed to have a more counter cyclical influence.¹⁰⁷

More broadly, the OECD has for years been recommending that medium term fiscal frameworks be strengthened. Such a framework would include explicit debt targets, multiyear budgeting, and strict expenditure ceilings to ensure that revenues accruing through credit booms were not spent. Further, an 'independent' fiscal council with a clear mandate, adequate resources and powers, and democratic accountability would help ensure this framework was observed in practice. Such a medium-term orientation for fiscal policy would also help prevent the kind of procyclical fiscal policies that characterized the years leading up to the current crisis.

Secondly, a serious reexamination of the use of monetary policy to 'clean up' after the burst of credit bubbles is needed. This has been the standard practice over the last twenty years, if not longer; the so-called 'Greenspan put'. Moreover, as this monetary policy easing had a diminishing effect over time, not only did it have to be used increasingly vigorously in successive cycles, but eventually other supportive measures (like two rounds of quantitative easing) had to be used as well. The extraordinary measures of the last two years must then be seen as the inevitable result of the policies followed earlier. Thus, of even greater importance than devising an 'exit policy' from the current extreme policy settings, is devising an 'exit strategy' from the unsustainable path on which we have put ourselves.

Thirdly, measures need to be taken *ex ante* to ensure that financial crises when they do occur can be managed easily.

One important issue is that of institutions that are so big/complex and interdependent that their failure would have huge and essentially unpredictable implications. In sum, they currently cannot be allowed to fail. To deal with this, one must take steps to lower the Expected Economic Loss (given the failure of such an institution) to acceptable levels. This could be done by some combination of lowering the probability of default, and lowering the loss given default.

To lower the probability of default, capital requirements could be raised (on average) and made both more countercyclical and more tailored to the contribution made by individual institutions to systemic risk. There are proposals extant (Basel 3) for dealing with each aspect of this suggestion.¹⁰⁸ In addition, risk taking could be reduced, either by regulation or by legislation, to preclude financial institutions with 'utility' like functions from undertaking certain other functions like proprietary trading.

As to lowering the potential losses given default, what is first required is domestic legislation allowing the rapid closure of financial institutions. In addition, institutions should develop 'living wills' to provide guidance as to how such legislation would be practically applied. For internationally active institutions, further requirements would be international agreements on information sharing, burden

sharing in the case of default, and prior agreements as to how different national laws would be applied in a coherent and consistent way.

The issue of insolvency legislation for large, internationally active banks provides an illustration of how difficult it will be to implement these suggestions. Such legislation is required even if relatively greater reliance is put on measures ('bail-in bonds' for example) designed to avoid bankruptcy in the first place. However, getting internationally agreed standards and practices will not be easy. The fact that the recent Dodd-Frank bill in the US emphasizes early and orderly closure, while the Europeans seem to prefer the 'bail in' alternative, gives some indication of the continuing problems in this area. Until these issues are resolved, the 'too big to fail' problem will remain a very significant threat to global financial and macro-economic stability.

Moreover, the existence of firms that are 'too big to fail' is only one channel through which systemic problems can emerge. The fundamental point is that interactions within the financial system, and between the real economy and the financial system, give rise to a 'complex' system which might be thought to share characteristics with other complex systems¹⁰⁹ in nature. Scientists working on earthquakes, forest fires, epidemics, and other such complex systems contend three things. First, systemic crises are inevitable.¹¹⁰ Second, their timing is essentially unpredictable. Third, the magnitude of the crisis bears no relationship to the size of the shock that sets it off. Recall, for example, how in the Asian and Long-term Capital Management (LTCM) crises, market risks became transformed into counterparty risks, and then liquidity risks, and how operational breakdowns were only just avoided. The conclusion this points to is that one needs a deeper understanding of how systemic crises propagate themselves, and one then needs to focus on the steps needed to prevent this from happening. In the area of forest management, for example, artificial fire breaks and a regular clearing out of underbrush (by letting small fires burn) are examples of good practice.

Against this background, it could be contended that the measures taken to date to address systemic issues have been inadequate. The Basel 3 proposals do make an effort to identify institutions having

characteristics (like size, complexity and interconnectedness) likely to make their failure particularly costly. However, instead of trying to constrain directly those characteristics (limitations on size, interconnectedness etc.) which would lower the potential losses given default (analogous to a firebreak in forestry), the Basel proposals instead focus on raising capital requirements and reducing the probability of default. Moreover, these increased capital requirements continue to be based on measures of 'risk weighted' assets, even though a number of commentators have argued that the 'risk weight' approach of Basel 3 actually increases systemic risks. For example, it is contended that attempts to game the system of risk-weighted charges (as indicated in the past by the rise of the 'shadow banking system') encouraged higher leverage.¹¹¹ At the same time, such actions also increase interdependence and thus systemic risk in turn.

As one attempts to deepen the understanding of the character of systemic problems, Hellwig (2010) and Slovik (2011) suggest the possibility of an interim solution; namely, to demand much higher capital ratios for all banks and to base those requirements on the level of un-weighted assets. The introduction, under Basel 3, of an overall leverage ratio (based on un-weighted assets) to complement risk-weighted capital ratios, goes in this direction, but the leverage allowed continues to be very high.

Crises would also be managed better if certain procedures were decided upon in advance. As for the public sector, the various shortcomings in this regard (preceding the current crisis) were referred to above. The basic problem is that, without explicit agreements on what governments will do and will not do, an emergency will inevitably result in the application of the worst and most costly safety net instruments available. For example, in the absence of explicit and limited deposit insurance in most European countries, they wound up in the end (following an initial decision by Ireland) guaranteeing essentially all the liabilities of European banks. As for the private sector, Rogoff (2011), Schiller and Weiss (1999), and others have suggested much greater reliance on debt contracts with contingency clauses. This would provide a less disruptive alternative to normal bankruptcy.

Concluding Comments

The global economy has been on a bad policy path for many years. In the AMEs, there has been inadequate leaning against the upswing of successive credit bubbles, and too much reliance on macroeconomic stimulus in downturns. Unfortunately, when the current crisis hit, the macro-economic policy response was essentially 'more of the same' and then 'still more of the same'. Having been much overused, these traditional policies of macro-economic stimulus will no longer suffice to put the AMEs back on a sustainable growth path. With many EMEs resisting exchange rate appreciation, their own future prospects are now also threatened by both inflation and imported 'imbalances'. The discipline provided by a 'better' international monetary system might have helped mitigate these problems.

Solutions for these deeply imbedded problems will not be easy to find. In this chapter it has been suggested that enhanced international cooperation, explicit attempts to restructure and reduce excessive debt levels, and structural reforms to improve the functioning of economies might provide a surer, if slower, means of restoring sustainable growth. It was also noted that there are formidable obstacles to the implementation of each of these suggestions. Recognizing the social and political dangers associated with a long period of slow global growth, committed political leadership is required to remove these obstacles. Both 'magnanimity and courage' are needed.¹¹²

Looking forward, steps need to be taken to avoid repetition of the circumstances that contributed to the current crisis. Most important is the need for an analytical framework that, not only recognizes the fundamental importance of the financial system, but also that today's policy prescriptions can have longer-lasting effects (due to credit-financed stock accumulations) that work in the opposite direction to those originally intended. As a corollary to this, there should be less tolerance of extended, credit fuelled upswings that invariably end in tears. Similarly, there should be greater tolerance for small economic downturns that would act as warnings to both borrowers and lenders not to overextend themselves. In this way, the serial cycles that have brought one to the current state might be most effectively avoided.

All this said, steps to help manage crises better in the future should be continued. It is only human to hope for the best, but it is only prudent to plan for the worst.

Endnotes

- ¹ The views expressed in this chapter are those of the author and do not necessarily represent those of the OECD or its member countries.
- ² Consider Chairman Bernanke's statement in May 2007: 'We do not expect significant spillovers from the sub prime market to the rest of the economy or to the financial system'.
- ³ Treasury Secretary Henry Paulson stated in March 2008: 'Our investment banks are strong. Our banks are strong. They are going to be strong for many, many years.'
- ⁴ As late as the spring of 2008 the IMF's World Economic Outlook was forecasting that world output would grow 3.7 per cent in 2008 and 3.8 per cent in 2009. The actual outturn was 2.8 and -0.7 per cent. For the advanced economies, the forecasting error was even bigger; the forecast for 2008 was 1.3 per cent versus an actual outturn of 0.1 per cent, and the forecast for 2009 was 3.8 per cent growth versus an actual outturn of -3.7 per cent. A forecasting error of 7.5 percentage points of GDP must be unprecedented.
- ⁵ There is a methodological shortcoming here. Government revenues and expenditures are cyclically adjusted to reveal the underlying 'structural' balance. Unfortunately, this implies that anything not identified as cyclical is named 'structural' and is all too easily deemed 'permanent'.
- ⁶ For a fuller discussion see White (2010b)
- ⁷ This is an important characteristic of 'real business cycle' and DSGE models. See Tovar (2008)
- ⁸ This is not to deny that the Obama administration did introduce a significant degree of discretionary stimulus, and that they gave the Federal Reserve wide ranging powers to help stabilize the financial system. The irony is that the voters' rejection of the Democrats (for doing too little) implied an embrace of Republican candidates who generally felt that the government had already done far too much in both the fiscal and crisis management realms.
- ⁹ For a fuller description, see White (2008a)
- ¹⁰ Galbraith (1990), pp 22–23, suggests that this is a common feature of all such downturns; 'There will also be scrutiny of the previously much praised financial instruments and practices. What will not be discussed is the speculation itself or the aberrant optimism that lay behind it.' He attributes this to the theology, that 'the market' is not supposed to be

subject to an inherent and internal dynamic of error'. Much more recently, Lo (2011) reviews 21 books written about the current crisis. With one exception, they all deal with the various ways in which the financial system has developed and become more 'elastic' in recent years. Admittedly, since Lo is an expert in finance, he might have been expected to choose books which focused on the 'financial' as opposed to the 'monetary' roots of the crisis.

- 11 On this, see Reinhart and Rogoff (2009) and Kindelberger and Aliber (2005).
- 12 A crucial fact from the Reinhart and Rogoff study (p. 145) is that a large proportion of the financial crises they studied began with a downturn on the real side of the economy; 'Severe financial crises rarely occur in isolation. Rather than being the trigger of recession, they are more often an amplification mechanism'. The Great Depression, for example, began with an economic downturn in 1929 while the financial sector crisis erupted only in late 1930.
- 13 The Bank for International Settlements was an exception with its staff providing repeated warnings of the dangers building up under the surface of the Great Moderation. See for example, Borio and White (2004) and Annual Reports of the BIS dating back to the late 1990s.
- 14 See in particular the BIS Annual Report for 2006.
- 15 For an overview see Haberler (1984) and Laidler (1999).
- 16 The Federal Reserve continues to insist that monetary policy played only a minor role, if any, in causing the crisis. In contrast, John Taylor (2010) notes that the Fed allowed monetary policy to ease much more than a Taylor rule would have suggested between 2001 and 2003 and then tightened too slowly subsequently. He ascribes much of the speculation and leverage which preceded the crisis to these monetary developments.
- 17 For a more formal evaluation of this, see White (2006b) and Muellbauer (2007).
- 18 Rajan (2010).
- 19 See OECD (2011b).
- 20 For a wonderful review of the moral and social dimensions of debt, and the need for 'payback' as reflected in the world's literature, see Atwood (2008).
- 21 For a review of the pre-war literature on this, see Selgin (1999). For a more recent assessment see Beckworth (2008).
- 22 This is the basic thesis of White (2009).
- 23 In particular, foreign exchange intervention by creditor countries causes their reserves to increase. These reserves tend to be managed quite

conservatively. This gives a special favour to US dollar assets, and to sovereign liabilities more generally, given their relatively greater liquidity.

- ²⁴ This refers to the problem first identified by Robert Triffin, a professor at Yale, in the early 1960s. If the dollar is desired as the 'risk-free' or reserve asset by other countries, then the US must run a trade deficit to supply such assets. However, as the stock of liabilities to foreigners rises, then the risk-free status of dollar assets progressively declines.
- ²⁵ The European crisis is essentially a balance of payments crisis linked to excessive credit creation within the euro area. Contrary to what appears to be the official German position, its roots are not in excessive government deficits in peripheral countries. Prior to the crisis, Spain, Ireland, Estonia and Belgium had smaller deficits than Germany. As for government debt levels, these had been declining sharply in Spain, Ireland and Estonia, to pre-crisis levels well below Germany. In contrast, the peripheral countries first drawn into the crisis all had massive current account deficits which required external financing. Confronted with a 'sudden stop' of such capital inflows, the crisis was on.
- ²⁶ This development in financial markets in Europe is analogous to the creation of 'toxic assets' in the United States. Both increased the 'elasticity' of the credit system, amplifying the 'imbalances' created by easy monetary policies.
- ²⁷ A few saw this problem right from the beginning. See Connolly (1997). McCauley and White (1997), 348–353 and Box 6.2, also suggested that the narrowing of spreads in the late 1990s for sovereigns with initially high debt levels (Belgium and Italy) was hard to rationalize. They made similar comments about the relatively favourable ratings given to these countries by both Moody's and S&P.
- ²⁸ Again analogous to the global imbalances, a long period of growth and market tranquility in the Euro area (akin to the Great Moderation) reduced the market's sensitivity to risks accumulating under the surface in the peripheral countries.
- ²⁹ See Minsky (1992). A 'Minsky moment' refers to that instant when fears of counterparty risk suddenly explode and lending (even between banks) ceases. For a recent example, recall what happened in the aftermath of the failure of Lehman Brothers. A particular danger, should the crisis affect systemically important sovereigns (Italy and Spain in particular) or banking systems (In Germany or France) in the Eurozone, is that it might lead to a breakup of the zone itself. This would then lead in turn to 'the mother of all currency mismatch problems'. See Eichengreen (2010) and Global Economic Perspectives (2011).
- ³⁰ Reinhart and Rogoff (2009), Reinhart and Reinhart (2010), Schularick and Taylor (2009), World Economic Outlook (2008) and (2009), and Roxburgh C. et al (2010).

- ³¹ See McKinsey Global Institute (2010). This study (p. 34) identifies the household sector in a number of countries (UK, US, Spain, South Korea and Canada) as likely to require substantial deleveraging. The construction and real estate sectors in many countries are also exposed. In contrast, the study notes (p 11) 'Financial sector leverage ...has already fallen to the average historical levels prior to the crisis.'
- ³² Reinhart and Rogoff (2009) point out that this increase in sovereign debt is very common in the crises they studied. The explosion of sovereign debt in the current crisis reflected an almost continuous rise in sovereign debt ratios in previous decades. In part this reflected the fact that fiscal policy failed to be tightened in upturns as vigorously as it was eased in downturns. In the 'boom' leading up to the current crisis, unusually strong revenues (often associated with financial sector profits) were again spent. When these revenues disappeared in the 'bust', and the automatic stabilizers also kicked in, the effect on deficits was dramatic.
- ³³ See Reinhart and Reinhart (2010). The note at the bottom of Figure 8 in their paper says 'The median increase in credit/GDP in fifteen post war severe financial crises is about 38 per cent, well below the 59 per cent surge prior to the current crisis'. In commenting on that paper, White (2010c) provides further arguments to support the view that the current economic downturn might prove particularly damaging. For example, he notes that that each of the components of the index used by Reinhart and Reinhart to identify 'serious' financial crises likely underestimates the magnitude of the problem facing the financial sector currently.
- ³⁴ See Cochran and Glahe (1999).
- ³⁵ On Hayek's admission see Haberler (1984) p. 422.
- ³⁶ Whether the standard textbook model actually reflected Keynes' views has been a disputed issue for a long time. See Leijonhufvud (1968). In effect, Leijonhufvud criticized the IS/LM framework on very similar grounds to the criticisms now being made about real business cycle and DSGE (Dynamic Stochastic General Equilibrium) models. In order to be mathematically tractable, all of these models leave out most of what is really interesting about how different economic agents interact to produce macroeconomic outcomes, including 'Deep Slumps'.
- ³⁷ It is often forgotten that Keynes was strongly opposed to inflation. See Keynes (1940).
- ³⁸ In contrast, when the coalition government replaced the previous Labour government in UK, they embarked almost immediately on a policy of fiscal retrenchment. Of course, the Labour Government might have done the same if reelected.
- ³⁹ Of course, it needs to be mentioned that automatic stabilizers in continental Europe are generally much larger than in the United States.

- ⁴⁰ The 'debt brake' idea was first conceived of by the Swiss, and then incorporated into the German constitution. Since then, the Spanish and Hungarian governments have passed similar legislations. A 'debt brake' implies that the cyclically adjusted deficit must be zero over the cycle. In a growing economy, this implies a gradually declining debt-to-GNP ratio.
- ⁴¹ For a fuller analysis of differences between central banks, see White (2011).
- ⁴² See Shirakawa (2010).
- ⁴³ These issues are addressed at greater length in White (2009).
- ⁴⁴ On the US experience, see Bernanke (2002) on the occasion of Milton Friedman's 90th birthday. He concludes with the memorable words 'I would like to say to Milton and Anna (Schwartz). Regarding the great Depression, you're right, we did it. We're very sorry but thanks to you, we won't do it again.' On the Japanese experience, see Ahearne et al (2002).
- ⁴⁵ The Japanese tried such policies, beginning in the late 1990s. They continue to be highly skeptical about their usefulness in stimulating demand, even if they did contribute materially to avoiding financial instability. See Shirakawa (2010) and Shirakawa (2012).
- ⁴⁶ Interestingly, this also seemed to have been the Fed's motivation for the first round of Quantitative Easing (now known as QE1). The motivation for QE2, however, seemed rather different. In effect, it came down to trying to stimulate what would have been considered an undesirable side effect under QE1; namely, causing asset prices to increase in order to increase 'wealth' and stimulate spending. The undesirable longer term effects of encouraging a still lower household saving rate in the United States are referred to below.
- ⁴⁷ For example, it was once commonly accepted (after the failure of 'Operation Twist' in US), that the elasticities of substitution between government bonds of various maturities were so large that changes in relative quantities would have little effects on rates.
- ⁴⁸ For an early discussion on the effects of interest changes on saving see Bailey M. J. (1962), Chapter VII.
- ⁴⁹ Dickinson (2000). Crédit Swiss has recently estimated that the pension funds of the S&P 500 companies in the United States were underfunded by 450 billion dollars at the of 2011, a large increase from 250 billion at the beginning of the year. See D. McCrum and N. Bullock (2012). For a quantitative analysis of the effects of interest rate changes on public pension funds and defined benefit funds, see Ramaswamy (2012).
- ⁵⁰ See Peek and Rosengren (2003) and also Shirakawa (2012). The latter states (p. 12) 'To be more specific, while firms and financial institutions were tackling the business of balance sheet repair, Japan's economy as a whole failed to adjust for a changing environment, such as increasing globalization and a rapid aging of the population'.

- 51 Should confidence in the Euro be restored, this scenario would seem more likely. Note as well rising wage inflation in China and a number of other Asian countries with large markets in the United States.
- 52 Expectations of this sort might arise even if the monetary authority was resolutely trying to control inflation in the short run. Indeed, if the maturity of the debt was short enough, higher interest rates might swell debt service enough to generate such expectations. In this case, disinflationary monetary policy could actually prove inflationary. See Leeper and Walker (2011). Their study concludes with the following observation for policymakers. 'Because two very different understandings of inflation can be equally consistent with observed data, it would be prudent to broaden the perspective on inflation determination beyond the single, conventional view that dominates policy thinking'.
- 53 The most famous example would surely be the hyperinflation in central Europe after World War I. Bernholz (2006) reviews a much wider spectrum of historical experiences.
- 54 Reference was made above to reductions in 'potential' estimated by the OECD. It is remarkable, in the face of an unprecedented increase in long-term unemployment, that the US authorities seem the least inclined of all the OECD member countries to accept that such a reduction has occurred. Further, with the US government facing a massive increase in debt levels, the political resistance to raising interest rates will be intense.
- 55 In mid-July of 2010, the Financial Times hosted a debate among some of the world's best known macroeconomists as to whether fiscal deficits, which had grown sharply during the recession, should be 'sustained' or 'restrained'. The radical differences in the views expressed indicated clearly that macroeconomics is hardly a 'science' as many American economists have contended.
- 56 Although the balance of evidence suggests that fiscal multipliers are significantly positive. See the IMF's World Economic Outlook (2010).
- 57 For example, German taxpayers might be more inclined to increase saving when the government dissaves than, say, American taxpayers.
- 58 Discretionary fiscal policy has been out of favour for over twenty years, on the grounds that it could not be made 'timely'. Further, it was generally thought that policy had to support an increase in permanent (not 'temporary') income before consumption was likely to be much affected. Finally, there continues to be serious disagreement about what 'targeting' means in practice.
- 59 See Cecchetti et al (2010).
- 60 In many AMEs debt ratios are already around 100 per cent of GDP. This implies that just stabilizing the ratio at that level would still leave countries prone to a loss of market confidence.

- ⁶¹ See Cecchetti *et al.* (2010).
- ⁶² Reinhart and Rogoff (2009). The authors are, however, much more hesitant about this hypothesis than many others who have referred to it.
- ⁶³ Current uncertainty about future corporate taxes is often invoked as an explanation for the refusal of US corporations to invest more heavily, in spite of having ample access to both cash and borrowed funds.
- ⁶⁴ For example, the Fiscal Pact introduced in early 2011 in the Eurozone was designed to strengthen significantly the terms of the Maastricht Treaty. However, many commentators have questioned whether it has succeeded in doing so.
- ⁶⁵ For a discussion on the issues pertinent to such decisions, see F. Sturzenegger and J. Zettelmeyer (2006)
- ⁶⁶ Consider the numerous measures suggested by the Financial Stability Board (later the Financial Stability Forum) to help prevent a recurrence of such behaviour.
- ⁶⁷ See C. E. V. Borio, B. Vale and V. G. Peter (2010).
- ⁶⁸ The so-called Volcker rule was conceived as a means of reducing this interdependence. Thus, it would also reduce the uncertainty about the implications of insolvency and would discourage forbearance.
- ⁶⁹ Under the arrangements known as Basel III, a significant tightening of capital and liquidity standards was envisaged. However, mindful of the risks to economic growth, the agreement was that these new standards would be phased in over a very long period (stretching to 2019 and 2020). Nevertheless, given the size of their potential exposure to two large banks, the Swiss authorities moved quickly to raise their near term prudential requirements well above the Basel standards. This initiated what became effectively 'a race to the top'. Subsequently, the European authorities also tightened near term capital requirements to try to restore confidence in core European banks affected by the Eurozone crisis.
- ⁷⁰ Raising capital requirements for European banks in the midst of a crisis, ostensibly to prevent future crises, could yet prove to be a disastrous policy error. European banks could use various means to meet the new requirements by June of 2012, not least issuing new shares or cutting dividends and salaries. However, there are also reasons why they might not want to do this. See Pignal and Jenkins (2011). In fact, a number of banks have already announced plans to deleverage (shrink assets), often by reducing international lending. This has begun to raise fears about access to credit in Central and Eastern Europe, as well as a number of Latin American countries, where the bulk of the banking system is foreign owned.
- ⁷¹ This phenomenon was first seen in the 1990s in Japan, after the onset of their crisis. Note too that this is not just a domestic phenomenon. Recently,

a whole new set of central bank swap agreements were announced to give non US central banks access to dollars to support domestic banks having trouble funding themselves in the dollar market.

- ⁷² This point has been made by Leijonhufvud (2009)
- ⁷³ See White (2012), the Committee on International Economic and Policy Reform (2011), and Gieve (2011).
- ⁷⁴ For an early, rather skeptical analysis of the ‘independence’ issue, see Crow (1993). He advises central banks in countries with democratically elected governments to avoid this word. Rather, the focus should be on establishing agreements with governments on the central bank’s mandate, powers and accountability. With governments properly giving the central bank its mandate, and also holding it accountable, ‘independence’ is then limited to the independent use of central bank instruments to achieve its mandate. In the Canadian case, even this ‘instrument independence’ is limited in that the Minister of Finance can send the Governor of the Bank of Canada a ‘directive’ to change the Bank’s monetary policy. Such a directive has never been sent.
- ⁷⁵ Recent labour market analysis at the OECD supports the introduction of ‘active flexicurity’ systems, as practiced in Denmark. Such systems rest on three pillars; significant reductions in employment protection, better benefits for the unemployed, and government encouragement and support to ensure the unemployed seek and find work.
- ⁷⁶ In fact, China’s trade surplus fell sharply in 2011. This was in part due to a sharp increase in imports of investment goods, whose effects on export potential might be seen only later, and to the slowdown in exports associated with recession in many advanced economies.
- ⁷⁷ This suggestion and those in the following paragraphs, have been made repeatedly by both the IMF and the OECD.
- ⁷⁸ Very recently, there have been particular concerns expressed about the further expansion of supply potential in a number of Chinese industries where profits are already under threat; solar panels, wind turbines, container ships and steel to name a few.
- ⁷⁹ Together with uncertainty about future tax liabilities, and concerns that interest rates must eventually revert to normal levels, concerns about prospective protectionism could also impede investment in deficit countries like the United States.
- ⁸⁰ Salter (1933) provides a sobering assessment of the shortcomings of international financial cooperation in the period between the two World Wars. Much of what he wrote still resonates today.
- ⁸¹ The second round of Quantitative Easing in the US was introduced primarily for domestic reasons. However, its international ramifications, not least capital outflows to EMEs, were significant enough to prompt the

Brazilian Minister of Finance to express fears about 'currency wars' and the threats posed by competitive devaluations.

- ⁸² The most senior Chinese leadership seems to accept the need for major policy changes within China. In a speech in Tianjin in the summer of 2010, Premier Wen Jiabao said 'In the case of China, there is a lack of balance, coordination and unsustainability in economic development'. These words are almost identical to those used in a speech made by Premier Wen in 2005. The fact that seven years have passed provides a clear indication of the implementation challenge in China.
- ⁸³ See the last OECD Economic Survey of China; Economic and Development Review Committee (2009) and Lardy (2012). Note as well that many of the state-owned enterprises (SOE), and even ostensibly private companies, are still strongly influenced by members of the Communist Party. This implies a resistance, at the very core of the political establishment, to any change in the (so far successful) export-led growth strategy.
- ⁸⁴ In this regard, it may be significant that in German the root word for 'sin' and 'debt' (Schuld and Schulden) is the same. Also see Atwood (2008).
- ⁸⁵ See G20: The Seoul Summit (2010) and G20: The Cannes Summit (2011).
- ⁸⁶ For many EMEs, including China, the European Union is their largest export market. Further, European banks have a major presence worldwide. As noted above, their withdrawal from certain geographic areas could have a material effect on credit availability. Given interconnections through the interbank and other markets, financial instability in Europe would likely lead to financial instability almost everywhere.
- ⁸⁷ For example, China and Japan among others could have agreed to exchange some of their foreign exchange reserves held in Bunds for bonds issued by the larger peripheral countries like Italy and Spain. This would have helped 'ring fence' these systemically important countries from the problems affecting the smaller peripherals. One reason for this decision by large non-European creditors (relatively poor) was that they were unwilling to put their tax payers' money at risk, when large European creditors (relatively rich) were themselves hesitant to do so.
- ⁸⁸ When UK went off the gold standard in 1932 and the pound depreciated, this was explicitly described as a 'default' in the US press.
- ⁸⁹ See Graeber (2011) and Atwood (2008).
- ⁹⁰ Not sufficient because the problem of being uncompetitive would remain.
- ⁹¹ General write-downs (whether via reduced principle or a lower interest rate or extended duration) would benefit many who would otherwise have serviced their debts regardless. Moral hazard is self-explanatory.
- ⁹² For a fuller account of problems in the US mortgage market, see Ellis (2008).

- ⁹³ A number of large US banks (including Bank of America, Citigroup and JPMorgan Chase) have cut down significantly on their mortgage servicing business. This reflects the rising costs of defaults and renegotiations, fears of lawsuits over inadequately documented foreclosures, and the threat of heightened oversight from the newly created Consumer Financial Protection Bureau. See Nasiripour (2011).
- ⁹⁴ After a time this stance was replaced by one which insisted on a 'voluntary' restructuring of Greek debt by private sector bondholders. The first proposal was for a 20 per cent haircut, but this rose to around 70 per cent by the time the restructuring was finalized. However, recognizing the dangers of contagion, the Europeans have continued to insist that no other peripheral country needs sovereign debt restructuring.
- ⁹⁵ OECD (2011a).
- ⁹⁶ Economics Department (2010a) and Economics Department (2010b).
- ⁹⁷ Note that the length of life is also rising. A standard set of OECD recommendation in this regard is to raise retirement ages, equalize them for men and women, and then index them to life expectancy.
- ⁹⁸ Young people should have seen that it was their tax burden (for pay-as-you-go pensions) that would be reduced. In contrast, they focused on the fallacy that only a given number of jobs exist. Thus, longer working lives for older workers was thought to mean fewer jobs available for younger workers.
- ⁹⁹ OECD (2010).
- ¹⁰⁰ The principal complication, when structural reforms must be implemented at a time of fiscal consolidation, is that there are no funds available to buy off vested interests.
- ¹⁰¹ Both Bible and Koran contain the story of Pharaoh's Dream. The basic lesson of the story is that we should avoid the temptation of assuming good times will go on forever. This tendency to extrapolate recent developments is still with us.
- ¹⁰² See White (2005). This framework envisages the use of monetary policy along with 'macroprudential' instruments to lean against the credit cycle. Note that the objective is neither 'price stability' nor 'financial stability'. While each is desirable, neither is adequate to avoid costly macro-economic crises. See White (2006a) on the former and White (2010a) on the latter. Recall as well one of the principal findings of Reinhart and Rogoff (2009); the majority of crises begin on the real side of the economy implying that financial stability is no guarantee of macroeconomic stability.
- ¹⁰³ Yet a lot of progress is being made. See Borio and Drehmann (2009) and Barrell et al (2010).
- ¹⁰⁴ See Van Norden and Orphanides (2002).

- ¹⁰⁵ This point is made persuasively by Brunnermeier *et al.* (2009).
- ¹⁰⁶ See White (2009) and, more recently, the Committee on International Economic and Policy Reform (2011).
- ¹⁰⁷ Various recommendations can be found in CGFS (2006).
- ¹⁰⁸ See in particular Basel Committee on Banking Supervision (2009), (2010) and (2011).
- ¹⁰⁹ For popular introductions to this literature see Buchanan (2002) and Beinhocker (2006).
- ¹¹⁰ More particularly, the incidence of crises follows a power law, in which the frequency of crises varies inversely (to a power) with the size of the crisis.
- ¹¹¹ In particular, see Hellwig (2010) and Slovik (2011). Slovik documents how, for systemically important banks, the ratio of risk-weighted bank assets to unweighted risk assets declined from almost 70 per cent in 1991 to almost 35 per cent in 2008.
- ¹¹² The full quote is from the last paragraph of Salter (1933). 'To face the troubles that beset us, this apprehensive and defensive world needs now above all the qualities it seems for the moment to have abandoned – courage and magnanimity'. Above all, Salter was appealing to the creditors of his time. The irony today is that the debtors of yesterday are the creditors of today, but the appeal still seems likely to go unheeded.

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Political Economy of Debt Accumulation and Fiscal Adjustment in a Financial Crisis

Parthasarathi Shome¹

Introduction

The 2008–09 global financial crisis that turned into an economic crisis affected mainly advanced economies that witnessed significant jumps in their respective public debts. The link between financial crises and build-up of public debt has been studied exhaustively, most recently, among others, by Reinhart and Rogoff (2010) using a historical cross-country time series of emerging and advanced economies. They establish ‘a strong link between banking crises and sovereign default’ (p. 1). A sequential and interacting process appears to be triggered, most of the times, by a catalyst of excessive domestic bank credit and external borrowing that lead to private debt surges and, with governments also borrowing heavily during these periods, precipitate domestic banking crises. They also found that banking crises in financial centres have led to banking crises elsewhere.

A banking crisis, in combination with rapidly rising public borrowing, leads to a sovereign debt crisis. Just as attention is focused on reining in public debt, hidden public debt at sub-national levels or elsewhere in the public sector gets identified and added to the already-known and quantified public debt. With sudden scaling up of public debt, the share of short-term public debt tends to rise expectedly to bridge pending payments and meet other immediate needs. Further,

this tendency, fueled by such excessive demand, heads towards hyperinflation.²

Reinhart and Rogoff caution that a domestic debt crisis appears when overall economic conditions are far worse than when there is an external default. Since external creditors are not largely involved, the domestic debt crisis tends to go unnoticed. Instead, it gets embedded in the evolving banking crisis. The authors assert that, even when noticed, countries suffer from a severe opacity syndrome of 'this time is different' ... 'The old rules of valuation no longer apply. The current boom, unlike previous booms that preceded catastrophic collapses... is built on sound fundamentals, structural reforms, technological innovation, and good policy' (p. 9–10). This is the most difficult part of their postulate to accept. If, as they say, over 200 years, a debt crisis and financial crisis have moved *pari passu* with each other, then it is difficult to comprehend how countries suffer from repeated short sightedness as the authors hold.

The fundamentals begin to crack well ahead of a collapse with indicators on consumer credit and public debt adequately revealing impending danger. More likely, therefore, it is the fear or unwillingness to take corrective measures even when a debt crisis is looming on the horizon and just before it has turned into a financial crisis. Indeed, even when the financial crisis has already appeared and is on the verge of turning into an economic crisis, advanced economy governments suffer an obstinacy by continuing to cajole the financial sector through mere encouragement to increase provisioning and continue to pay some tax, or demonstrate willingness to give them time to pay taxes, rather than taking more decisive action.³

Two elements are at play. First, the government financial heads are often from the private financial sector on secondment to the public sector, for example in the US and, second, during the short-lived span of financial sector excesses, it also contributes a high portion of corporate income tax revenue, for example, over 40 per cent in UK immediately before the recent 2008–09 crisis. It therefore becomes challenging to

take corrective action on oneself so to speak, in the presence of an embedded self-interest. Hence it is not opacity; rather, it is a mixture of deep unwillingness, and even strategic position taking perhaps, that vitiate possibilities of charting the right course needed for economic revival. At the other extreme, in emerging economies such as India, caution takes the form of excessive regulation if not control, a system that opts for financial sector stability over benefitting from the potential salutary effects of financial sector liberalization on long-term economic growth.

As in previous such experiences, the recent global experience has made apparent that the build-up of unsustainable public and private debt has the outcome of excessive public and private consumption mainly in advanced economies, that comprised unsustainable government subsidies to the household sector and 'ninja' – no income, no job, no asset – housing loans made by the multi-layered financial sector to unqualified borrowers under the rubric, 'financial innovation'. Subsequently, the same economies that routinely prescribed austerity for profligate emerging economies in the IMF's Executive Board (for Latin America in the 1980s and East Asia in the 1990s) as is amply evident from the Board's proceedings, prescribed for themselves heterodox policies, renamed 'fiscal stimulus' packages, for recovering from the 2008–09 crisis. Emerging economies made a severe error in going along with such policies. For example, there is no proof that India needed a fiscal stimulus during this period that basically undid the conservative fiscal stance that had been successful between 2004–08, generating, by global standards, record high real tax revenue growth and containment of public debt (Shome, 2012; 2013). Reversals from expansionary policies internationally have appeared only since 2010 after further macroeconomic deterioration in advanced economies and the realization that heterodox policies cannot lead an economy out of deep breaches in economic fundamentals. Thus, the reversal was inevitable since it failed finally to escape the judgment of rating agencies that have increasingly emerged as global economic standard setters.

The solution to the continuing economic crisis led by sovereign European debt has to be austerity through strong IMF surveillance and programs and a reversal of further pumping in of consumption in these economies. No amount of quantitative easing is likely to ramp up the low-level money multiplier, and no extent of fiscal relaxation will convince productive sectors to pick up on economic growth. In this light, in what follows, essentially using secondary information, the chapter charts the course of public debt growth in advanced economies, attempts to demonstrate the spillover of the debt crisis into financial markets, and examines the nature of measures taken by the concerned central banks.⁴

Public Debt in Advanced Economies

The global financial crisis of 2007–08 resulted in sharp deterioration in the public finances of advanced economies. Significant decline in government revenues, recapitalization of banks, purchase of debt and equity in distressed financial institutions and large stimulus packages to revive the economies led to substantial increases in public debt in Europe and the US.⁵ In the US, government revenue as a per cent of GDP declined from 33.9 per cent in 2007 to 31.2 per cent in 2009, while government expenditure as a per cent of GDP increased from 36.7 per cent to 44.05 per cent in the same period (WEO, 2011). Fragile recovery and increasing expenditure on healthcare and pensions in advanced economies compounded the debt problem. Figure 8.1 shows that public debt as a per cent of GDP in advanced economies increased from 76 per cent in 2007 to 108 per cent in 2011. In the US and Japan, public debt as a per cent of GDP increased by 38 per cent and 45 per cent, respectively. European economies abandoned their Maastricht criteria, which required members not to exceed a budget deficit ceiling of 3 per cent of GDP and a debt ceiling of 60 per cent of GDP. In the Euro area, the debt/GDP ratio increased from 68 per cent to 87 per cent between 2006 and 2011 (WEO, 2011). The debt explosion not only occurred in peripheral economies of

Europe but also in fiscal conservatives, Germany and France.

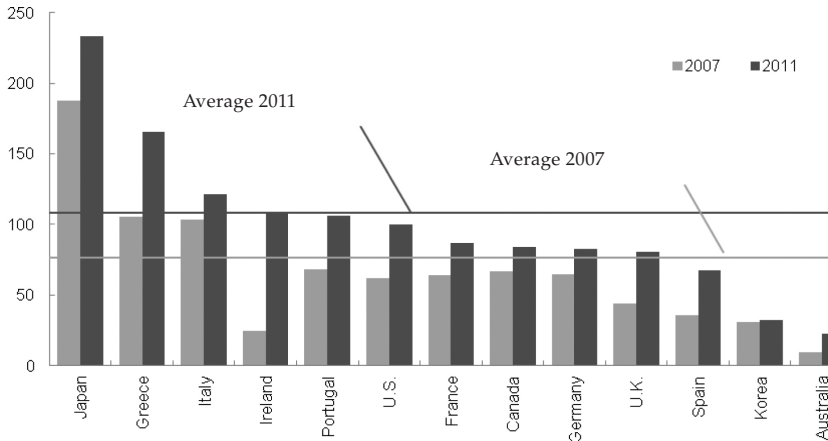


Figure 8.1: Selected Advanced Economies: General Government Gross Debt

Source: *Fiscal Monitor*, IMF (2011)

Note: Weighted averages based on 2009 purchasing power parity GDP.

It would not be too exaggerated to take the view that this debt build-up proved costly for European economies. Using historical data of advanced economies, Reinhart and Rogoff (2010a) claimed that '(countries) observations with debt to GDP over 90 per cent have median growth roughly 1 per cent lower than the lower debt burden groups and mean levels of growth almost 4 per cent lower'.⁶ While the numerical 90 per cent cut-off point has not withstood statistical tests, the negative association between the debt/GDP ratio and the rate of growth has remained firm. And, as distressed sovereign bonds have spilled out to overload and stress out the financial sector, it is fallacious to insist that further expansion, hence further debt accumulation, is needed to recover these economies.⁷

IMF projections for increase in government debt in advanced economies show that the primary reason for accumulation of public debt is revenue loss. According to IMF's *Fiscal Monitor* (2011), 'two-thirds of the projected debt surge is explained by revenue weaknesses associated with the recession and the direct effect on the debt ratio of

the fall in GDP' (Figure 8.2). However, what is not clear is how much of this revenue loss is due to the failures and losses of the financial sector and, despite future expansionary policies, whether and when the financial sector will start making revenue contributions again. In other words, the relationship between GDP pick up through expansionary stance of governments, and revenue growth, may suffer from a 'ratchet effect' and be only distantly linked at this point.

Slowdown in GDP is shown to have led to an unfavourable dynamics between interest rates and economic growth during the period, in spite of falling interest rates. 'Higher interest rates imply higher interest payments to service government debt, so adversely influencing debt dynamics, whereas higher nominal GDP growth will tend to lower the debt-to-GDP ratio by increasing the denominator' (Turner and Spinelli, 2011). Figure 8.2 shows that in advanced G20 economies, a projected 6.8 percentage points are attributed to the interest-growth dynamics within the overall 38.6 per cent debt/GDP increase. But the contention remains that the numerator can also be reduced more rapidly in order to get the ratio down.

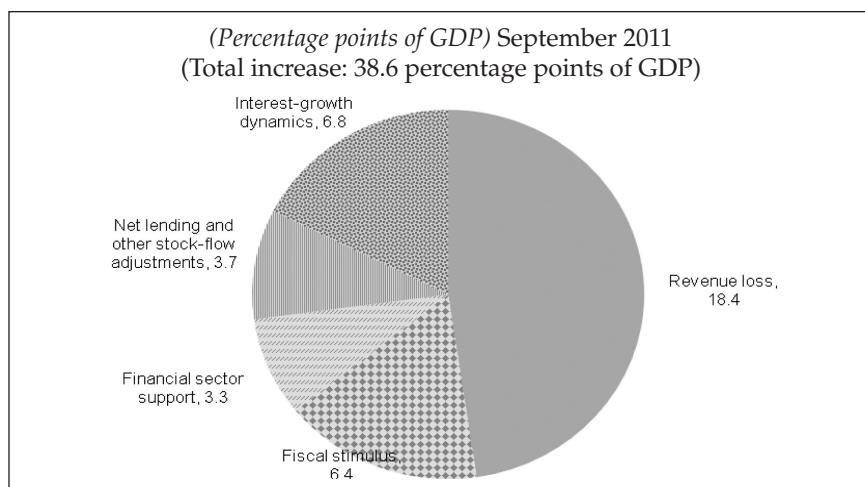


Figure 8.2: G20 Advanced Economies: Increase in General Government Debt, 2008–15

Source: *Fiscal Monitor*, IMF (2011)

Note: Weighted average based on 2009 purchasing power parity-GDP.

Figure 8.2 also shows that financial support and fiscal stimulus are set to account for 3.3 per cent and 6.4 per cent, respectively, in the projected debt accumulation. First, as a countercyclical measure, US, for example, enacted its Economic Recovery and Reinvestment Act in 2009. The \$787 billion stimulus package included tax relief for individuals and businesses, supporting individuals in need of purchasing goods and services, and providing funds to states and localities for Medicaid, education, and transportation projects (CBO, 2011). Second, to stabilize the financial system, crisis countries provided support to banks and insurance companies. Cumulative financial support in advanced economies as per cent of GDP since the beginning of the crisis accumulated to \$1,722 billion on a gross basis, as revealed by data ending December 2010 to July 2011 (Table 8.1). As a per cent of GDP, direct financial support constituted 6.8 per cent of GDP.

In absolute terms, the financial support provided in the US has been largest (though, in percentage terms, it is 5.1 per cent of GDP). The Troubled Asset Relief Program (TARP) comprised a significant part of this. TARP was introduced in 2008. Originally, it was set at \$700 billion though, in the Dodd–Frank Wall Street Reform and Consumer Protection Act, it was reduced to \$475 billion. The transactions covered under TARP fell into four categories: capital purchases and other support for financial institutions, financial assistance to the automotive industry, investment partnerships designed to increase liquidity in securitization markets, and mortgage programs (CBO, March 2011). Government disbursed \$414 billion⁸ of TARP, of which more than 50 per cent has already been repaid.⁹

Table 8.1: Selected Advanced Economies: Financial Sector Support
(Percentage of 2011 GDP unless otherwise indicated)

| Country | Direct support | Recovery | Net direct support |
|---------|----------------|----------|--------------------|
| Belgium | 5.7 | 0.3 | 5.4 |
| Ireland | 40.6 | 2.6 | 38.0 |
| Germany | 13.2 | 0.8 | 12.4 |

| Country | Direct support | Recovery | Net direct support |
|------------------|----------------|----------|--------------------|
| Greece | 5.8 | 0.4 | 5.4 |
| Netherlands | 14.0 | 8.8 | 5.1 |
| Spain | 3.0 | 0.9 | 2.1 |
| United Kingdom | 6.7 | 1.1 | 5.7 |
| United States | 5.1 | 2.0 | 3.1 |
| Average | 6.8 | 1.8 | 4.9 |
| In \$US billions | 1,722 | 452 | 1,270 |

Source: *Fiscal Monitor*, IMF (2011)

Note: Fiscal outlays of the central government, except for Germany and Belgium, for which financial sector support by sub-national governments is also included. Cumulative since the beginning of the crisis—last data range between end-December 2010 and end-July 2011.

Spillover of Debt Crisis into Financial Markets

Risk and volatility in global financial markets increased considerably. According to the European Central Bank's (ECB) Financial Stability Review (December 2011), 'the transmission of tensions among sovereigns, across banks, and between the two, intensified to take on crisis proportions not witnessed since the collapse of Lehman Brothers three years ago'. However, the trouble this time is originating from fiscal sustainability concerns in Europe and the US. The sovereign debt crisis which, in turn, was brought on by the global financial crisis, is threatening the stability of the financial system. High debt/GDP ratios and highly leveraged banking financial institutions reveal the vulnerability of advanced economies (Table 8.2).

Table 8.2: Indebtedness and Leverage in Selected Advanced Economies
(Percent of 2011 GDP, unless noted otherwise)

| | US | Japan | UK | Euro area | France | Germany | Greece | Ireland | Italy | Portugal | Spain |
|-----------------------------|----|-------|----|-----------|--------|---------|--------|---------|-------|----------|-------|
| Government Gross Debt, 2007 | 62 | 188 | 44 | 66 | 64 | 65 | 105 | 25 | 104 | 68 | 36 |

| | US | Japan | UK | Euro area | France | Germany | Greece | Ireland | Italy | Portugal | Spain |
|---|------|-------|------|-----------|--------|---------|--------|---------|-------|----------|-------|
| Government Gross Debt, 2011 ^a | 100 | 233 | 81 | 89 | 87 | 83 | 166 | 109 | 121 | 106 | 67 |
| Government Net Debt, 2007 ^b | 43 | 81 | 38 | 52 | 60 | 50 | 105 | 11 | 87 | 64 | 27 |
| Government Net Debt, 2011 ^{ab} | 73 | 131 | 73 | 69 | 81 | 57 | n.a. | 99 | 100 | 102 | 56 |
| Primary Balance, 2011 ^a | -8 | -8.9 | -5.6 | -1.5 | -3.4 | 0.4 | -1.3 | -6.8 | 0.5 | -1.9 | -4.4 |
| Households Gross Debt ^c | 92 | 77 | 101 | 70 | 61 | 60 | 71 | 123 | 50 | 106 | 87 |
| Households Net Debt ^{cd} | -232 | -236 | -184 | -126 | -137 | -132 | -57 | -67 | -178 | -123 | -78 |
| Bank Leverage ^e | 12 | 24 | 24 | 26 | 26 | 32 | 17 | 18 | 20 | 17 | 19 |
| Bank Claims on Public Sector | 8 | 80 | 9 | n.a. | 17 | 23 | 28 | 25 | 32 | 24 | 24 |
| Total Economy Gross External Liabilities | 151 | 67 | 607 | 169 | 264 | 200 | 202 | 1,680 | 140 | 284 | 212 |
| Total Economy Net External Liabilities ^f | 16 | -54 | 11 | 13 | 10 | -41 | 104 | 98 | 26 | 106 | 88 |
| Government Debt Held Abroad | 30 | 15 | 19 | 25 | 50 | 41 | 91 | 61 | 51 | 53 | 28 |
| <p>^a WEO projections for 2011.</p> <p>^b Net general government debt is calculated as gross debt minus financial assets corresponding to debt instruments.</p> <p>^c Most recent data divided by annual GDP (projected for 2011).</p> <p>^d Household net debt is calculated using financial assets and liabilities from a country's flow of funds data.</p> <p>^e Leverage is defined as the ratio of tangible assets to tangible common equity for domestic banks.</p> <p>^f Calculated from assets and liabilities reported in a country's international investment position.</p> | | | | | | | | | | | |

Source: IMF Global Financial Stability Report (September 2011) and WEO Database (for 2007)

It may be noted that, despite protests domestically (as may be expected in a life-cycle or inter-generational context), European economies are, by and large, attempting to follow containment policies in fiscal matters, *i.e.*, increased taxes and reduced government subsidies in order to reduce the fiscal gap, even though such expenditure measures imply GDP contraction in the immediate run. For example, Ireland and Greece imposed harsh austerity measures that were preconditions for receiving emergency loans,¹⁰ and UK's 2010 government imposed austerity measures on itself. Hence, reducing sovereign debt, while rethinking the course of eventual economic recovery, has become the new challenge.

It is as if in final realization and acceptance that the present experience is not an ordinary recession that can be resolved with stimuli, but one that has to be conquered and then sustained only with belt-tightening, or that traditional contractionary policies that the IMF has prescribed since its inception may work after all, that is leading these economies to shift course. Fiscal deficit and public debt have to be curtailed faster than contracting GDP. The error that was committed was the IMF's movement away from this traditional path since the 2008–09 period towards underscoring heterodox demand policies.

Bond Yield and Credit Default Swaps (CDS) on Sovereign Bonds

Debt sustainability due to increasing yield on government borrowing in several European economies has become a concern for the financial markets. Bond yield of several European economies has increased significantly (Figure 8.3a). With increase in risk, investors rushed into safe havens such as gold, US Treasury and German government bonds, pushing their prices to record high levels. Investors poured money into US Treasuries despite its high fiscal deficit/GDP and debt/GDP ratios and economic slowdown. Disagreements between Republicans and Democrats over the method of debt reduction also did not deter investors. Dominance of the dollar as a reserve currency played, and continues to play, an important role. On German bonds, investors

were making each-way bets: if the Eurozone breaks up, an appreciated Deutschmark will replace the Euro. However, if Germany decides to bail-out the Eurozone, the Euro will rise (Peston, 2011).

The Euro Area Member States (EAMS) created the European Financial Stability Facility (EFSF) in June 2010. Its mandate was to raise funds in capital markets in order to finance loans for those EAMS members that experience difficulty in obtaining financing at sustainable rates. The EFSF is able to issue bonds guaranteed by the EAMS.¹¹ Credit rating downgrades of several economies including France have complicated the EFSF rescue plan, as its ability to raise money rapidly at low interest rates is directly linked to credit ratings of member states.

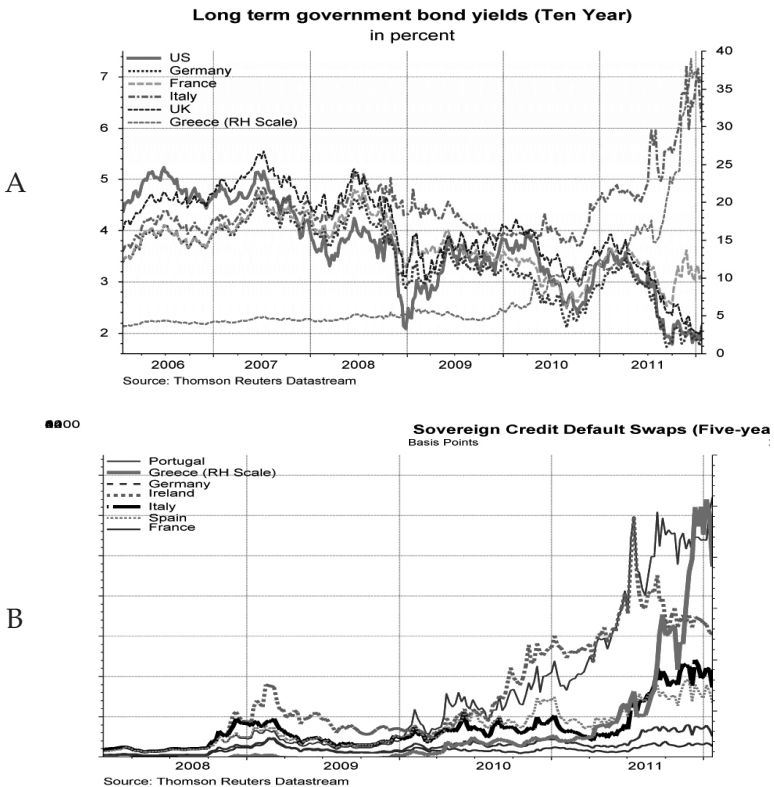


Figure 8.3a: A Long-term Government Bond Yields (Ten Year)
Figure 8.3b: Sovereign Credit Default Swaps (Five Year)

The costs of insurance on several European government bonds touched a record high (Figure 8.3b). In an effort to reduce speculation on sovereign default, the European Parliament voted on November 15, 2011 to ban 'naked' CDS.¹² In order to avoid a credit event, EU leaders insisted on a voluntary 'haircut' on Greek bonds in the rescue plan. Insurance firms that sold credit protection on Greece would not be required to pay buyers of the swaps if restructuring of debt involved any voluntary 'haircut'.¹³ These experiences reveal the scale of difficulties that has to be overcome for past excesses in consumption and credit growth, rather than to be used as an explanation for abandoning suitable containment policies.

Banking Sector Signals Continued Easing

The European banking system has been under heightened stress due to large holdings of distressed sovereign bonds. Prospect of large write-downs of sovereign debt to deal with the crisis has kept the banking sector on tenterhooks. 'In addition to these direct exposures, banks have taken on sovereign risk indirectly by lending to banks that hold risky sovereigns. Banks are also affected by sovereign risks on the liabilities side of their balance sheets: ... implicit government guarantees have eroded (as) the value of government bonds used as collateral has fallen' (GFSR, 2011). The cost of default protection on many banks' unsecured bonds has risen sharply. 'In the case of some European banking sectors, CDS premia rose to levels above those reached in late 2008/early 2009 (Figure 8.4). CDS premia for several Euro-area banking sectors moved closely with the premia of their respective sovereigns, reflecting in part the importance of banks' domestic sovereign risk exposures, (Bank of England, 2011). The poor financial health of European banks has adversely affected their bond sales and, with large expected redemption of maturing debt, the banking sector is facing a huge funding gap.¹⁴

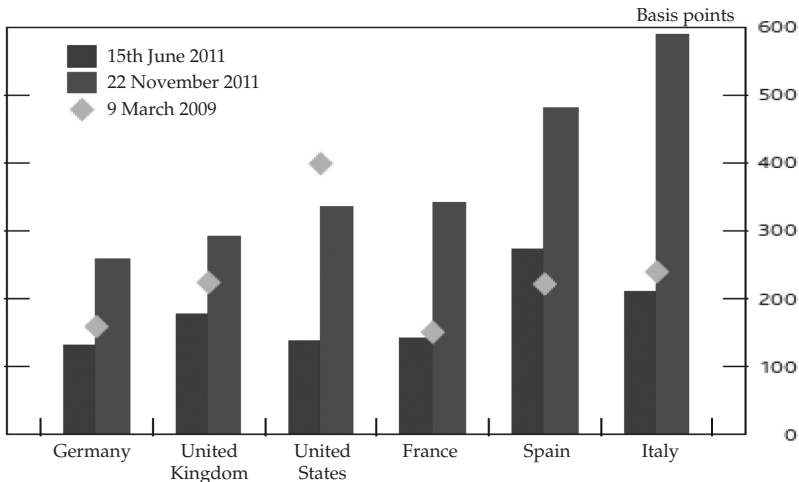


Figure 8.4: CDS Premia for Selected Banking Systems

Source: Bank of England, *Financial Stability Report*, December 2011.

For recapitalization needs, the European Banking Authority (EBA) recommended on December 8, 2011, that banks raise 114.7 billion Euros by June 2012 (EBA, 2011). This narrowed the problem to a region, as most of the capital requirement fell on lenders in Spain, Greece, Italy and Portugal. The banking sector could resort to asset sales or reduce lending to meet their capital requirements; such austerity measures and shrunk capacities to lend were the price that some European economies would have to pay to emerge from their respective crises.

The timing of EBA's recommendation for bank recapitalization has been criticized even though European Central Bank (ECB) asked national supervisors to ensure that it does not lead to 'unwelcome pro-cyclical deleveraging involving significant constraints on the flow of credit to the real economy'.¹⁵ The challenge before the authorities has been to reduce financial sector vulnerability without hurting the flow of funds to the real economy too adversely. There is little other course to take except to buttress such action where feasible.

The ECB took a series of measures to counter such a squeeze in lending. Apart from cuts in policy rates, ECB also offered banks unlimited cash for three years and loosened the collateral criteria by making credit claims such as bank loans (specifically residential mortgages and loans to small and medium businesses) eligible and

reducing the rating threshold on asset-backed securities.¹⁶ The ensuing rush for ECB's three-year Long-Term Refinancing Operation (LTRO) betrayed the underlying vulnerability of European banks, while the earlier stigma associated with resort to central bank support was no longer valid.

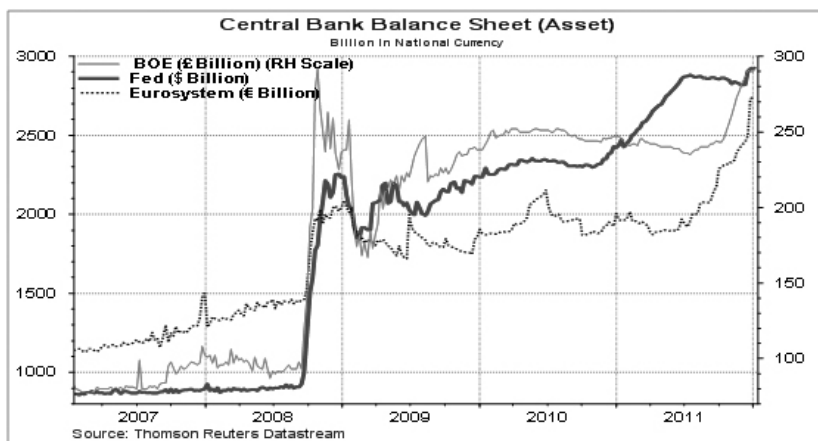


Figure 8.5: Central Bank Balance Sheet (Asset)

Source: Thomson Reuters Datastream

Expansionary monetary policy to deal with the debt crisis stretched the balance sheets of advanced economy central banks (Figure 8.5). Major central banks expanded their balance sheets to drive down the rate of interest on long-term government bonds (Blommestein and Turner, 2011). The US Federal Reserve balance sheet expanded by \$505 billion in 2011 because of a significant increase in its holding of US Treasury securities.¹⁷ However, the holding of mortgage-backed securities declined.¹⁸ Eurosystem balance sheet also expanded by €809 billion, primarily because lending to Euro area credit institutions related to monetary policy operations increased in the same period.¹⁹ The impact of the quantitative easing was also visible on the balance sheet of the Bank of England, which increased by £43 billion reflecting an increase in 'other asset holding'.²⁰

Such expansionary monetary policies would likely be better than further fiscal stimuli. If systemically they remain unabsorbed, the

signal for correction should reveal itself with continuing low money multipliers. In contrast, fiscal expansion could drive up interest rates and exacerbate inflation. Ultimately, economic realism with fiscal prudence as the corrective factor that convinces rating agencies. This will have to be depended upon for successful recovery, albeit at a lowered, sustainable growth path.

Conclusion

Historical evidence is ample that global financial crises have their genesis in excessive spending by households and governments. The build-up in private debt reflects not only high demand but also easy availability of loans for consumer spending spearheaded by the financial sector. Investors are led to believe that returns from banking and financial stocks are high, and they invest heavily in financial stocks. High returns to the financial sector often result in disproportionate remuneration and returns to financial sector managers and staff. At this stage, this sector also contributes a good portion of corporate sector tax revenue in a global environment where garnering revenue from the corporate sector has become increasingly difficult for tax administrations. The revenue contribution by the financial sector thus develops into a cozy relationship between government and the financial sector in which the financial sector excesses are overlooked as long as it shares part of its returns with the exchequer.

This phase of increased private spending is usually accompanied by a rapid rise in public expenditure. They combine to cause a build-up in private sector debt as well as public debt. Even as public debt build-up gets scrutinized, new public debt components become visible which were not accounted for earlier, and inflationary pressures appear. Governments are reluctant to take action on the financial sector because of the revenue connection and, perhaps equally importantly, of the synergy that evolves from participation of the private financial sector directly in government with high likelihood of an eventual return to origin.

Even when a financial crisis is clearly converting to a global economic crisis, government action remains painfully slow. To add to the complexity, reflecting the globalization of financial markets, governments are obliged to take action cooperatively. This becomes almost impossible as has been evidenced in the slowness of the G20 process in coming to grips with the need for financial regulation (Shome and Ratniram, 2010). In the absence of clarity, once uncertainty in financial markets takes hold volatility increases. It spreads not just in financial markets, but to commodity markets as well. This is because commodity markets, which were traditionally less risk prone since they reflected underlying demand–supply factors more closely, have become increasingly financialized, following similar rapid rise and fall patterns as financial markets. The increasing volatility in commodity markets impacts economic growth adversely, helping to convert a financial crisis into an economic crisis among other links and causes.

The emergence of a Euro area debt crisis led the re-emergence of an economic crisis in 2011. If one ponders the sequence of events between 2009 and 2011, the unmistakable conclusion is the prevalence and growth of erroneous overexposure of European banks in excessive demand economies with a high build-up of debt, within their own economic area. It is difficult to accept that, despite the 2008 global crisis, such banks continued to suffer from Reinhart and Rogoff's 'this time is different' postulate. The conclusion has to be that demand needs to be scaled back to the full extent needed by implementing, through a clearly delineated roadmap, such fiscal policy that brings debt quickly to sustainable levels. Further, the problem needs to be solved primarily from resources within the affected region.

For resources from elsewhere, there is an important anchor from where problem solving should be launched in a meaningful way. It is the IMF. It is perhaps not entirely surprising that the IMF has opted for supporting expansionary policies in a diversion from its well-established demand management approach to economic recovery and for which it had developed a reputation of an essentially unbiased monitor. It should revert to its traditional framework lest its reputation should be further diminished. Rules of the game should be perceived

to adhere irrespective of the times, or of who the protagonists are. If that happens, replenishing the Fund adequately should be feasible and rebalancing could occur essentially with IMF resources and through its strong adjustment programmes. What is not being realized immediately is that once reputation is lost, it would be far more difficult to reinstate it than to resist heterodox shifts in its policy framework reflecting large shareholder interests.

Endnotes

- ¹ Opinions and views are exclusively the author's. The author appreciates the research assistance of Shuheeb Khan, Research Associate, ICRIER.
- ² They define an 'inflation crisis' as above 20 per cent for US; internationally, in the post Second World War period, 40 per cent as a 'freely falling episode'; and hyperinflation as above 500 per cent.
- ³ Soon, of course, the sector pays little tax once it begins to show losses, a situation that may continue for many years before outcomes turn to taxable profits.
- ⁴ This author has taken a similar overall view in his writings in *Business Standard*, the Indian daily, emphasizing the need for adhering to a cautious approach for achieving a chastened level of economic growth, while pointing towards lingering inconsistencies in the ongoing dialogue and debate. See Shome, 'Globalisation and G20', 13 November 2010; 'Year of Fiscal Consolidation', 12 February 2011; 'The Evolving Fiscal Stance', 12 March 2011; 'Financial Market Behaviour', 14 May 2011; 'Volatile Times', 9 July 2011; 'Countdown to Cannes', 8 October 2011; and 'Has the Euro Matter Now been Solved?', 19 December 2011.
- ⁵ Cecchetti et al. (2010).
- ⁶ The above 90 per cent debt/GDP observations come mainly from Belgium, Greece, Italy and Japan, among twenty advanced countries between 1946–2009.
- ⁷ The argument that unless this happens even emerging markets such as India would suffer because of loss of export markets lacks lustre. First, domestic demand has prevailed in many emerging economies; second, such economies should aggressively seek new markets within emerging economies; and, third, their own excessive demands may need to be contained in light of global economic and environmental challenges. Seen

in such a long-run perspective, the argument of export dependence lacks conviction. After all, the G20 has included a 'green' recovery among its focus areas.

- ⁸ Report on the Troubled Asset Relief Program (December 2011).
- ⁹ The figure for the US in Table 8.1 refers to a wider financial sector support than through TARP.
- ¹⁰ <http://www.nytimes.com/2011/12/30/opinion/keynes-was-right.html>.
- ¹¹ EFSF Newsletter (2011).
- ¹² <http://www.eubusiness.com/news-eu/finance-economy-cds.dij>.
- ¹³ <http://www.forbes.com/sites/steveschaefer/2011/10/27/why-voluntary-haircuts-on-greek-bonds-is-a-pyrrhic-victory/>.
- ¹⁴ European banks sold bonds worth \$413 billion in 2011, while \$654 billion were due to be returned to investors as debts mature. In 2012, debt worth \$720 was to mature (Financial Times, 2011).
- ¹⁵ ECB (2011)
- ¹⁶ <http://uk.reuters.com/article/2011/12/08/ecb-liquidity-idUKL5E7N83LO20111208>.
- ¹⁷ Holding of US Treasury securities increased by \$656 billion between 29 December 2010 and 28 December 2011.
- ¹⁸ Holding of mortgage securities fell by \$155 billion between 29 December 2010 and 28 December 2011.
- ¹⁹ Lending to Euro area credit institutions related to monetary policy operations increased by € 350 billion between 24 December 2010 and 30 December 2011.
- ²⁰ Holding of other assets increased by £50 billion between 29 December 2010 and 28 December 2011.

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Rethinking Central Banking

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Introduction

The Golden Age of Inflation Targeting

High inflation in the advanced economies in the 1970s and in emerging economies in the 1980s and 1990s was instrumental in shaping modern thinking about the practice of central banking. The tenets of the resulting framework are familiar and, to a large extent, uncontroversial. First, there is no permanent tradeoff between inflation and unemployment, a sustained higher level of inflation does not lead to higher growth and a sustained lower level of unemployment. Second, high and volatile inflation depresses growth and distorts the allocation of resources. Third, inflation disproportionately harms the poorest segments of society, which lack instruments for protecting themselves from its disruptive effects. For all of these reasons, price stability is the cornerstone of monetary policy.

The actions needed to achieve price stability, such as the maintenance of high interest rates, can be politically unpopular, among other reasons because they slow growth. It follows that the pursuit of price stability can be made more credible and thus more effective by granting independence or at least operational autonomy to the central bank. Otherwise, central banks may be subject to political pressure to

attach greater weight to other objectives, making it harder for them to contain inflationary expectations and deliver desirable outcomes.

By the early 2000s, a growing number of central banks, in advanced countries and emerging markets alike, had converged on a policy framework, *flexible inflation targeting*, that seemed capable of achieving these desiderata and delivering macroeconomic stability at the national and international levels. In the conventional view, there are four explanations for this favourable outcome:

- Flexible inflation targeting, under which the central bank aims to stabilize inflation around its target but also minimize the output gap, delivers low inflation at the national level, thereby avoiding the need for large nominal exchange-rate adjustments and the kind of overshooting that characterized the 1980s.²
- Flexible inflation targeting, by allowing for exchange rate variability, facilitates international adjustment. Countries experiencing demand shocks can cushion them through interest-rate changes and associated movements in exchange rates.
- Flexible inflation targeting makes reserve accumulation unnecessary, since exchange-rate intervention is rare and limited to short-term responses to market disruptions and to a signaling role in cases of serious misalignments.
- The combined policy stance of the countries following this strategy is supposed to ensure an appropriate level of aggregate demand at the global level.

The generalization of inflation targeting-cum-floating exchange rates could thus be regarded as the triumph of the 'own house in order' doctrine in the international monetary field. National macro-economic stability was seen as sufficient for international macro-economic stability. The domestic and international aspects were essentially regarded as two sides of the same coin.³

According to the emerging orthodoxy, an added benefit of flexible inflation targeting was that it allowed the objectives of price stability and financial stability to be pursued through separate tools - monetary policy for the former and micro-prudential regulatory and supervisory

measures for the latter. Tinbergen's separation principle, i.e., the idea that each goal should be pursued with a separate and dedicated instrument, was widely invoked in this context.

In this orthodox view, monetary policy focuses on controlling inflation and works by managing expectations of future policy rates, which by the expectations theory of the yield curve determine the long-term interest rates that influence aggregate demand. Financial stability is attained by micro-prudential regulation of bank capital that counteracts the moral hazard generated by deposit insurance, together with periodic supervisory assessments and the necessary strictures meant to prevent excessive risk taking and malfeasance. Regardless of whether the micro-prudential regulator is situated in the central bank or a separate specialized regulatory agency, financial regulation is seen as a separate activity.

Central bankers nowadays often observe that flexible inflation targeting was never as straightforward as this framework suggests and that issues of financial stability and spillovers were always on their minds. Still, it remains accurate to say that the basic theoretical framework sketched above did much to shape their thinking. Its clarity and simplicity enabled it to gain adherents in academia and financial markets as well as in central banks.

Rethinking the Framework

Some of the practical achievements of the flexible inflation targeting framework are indisputable. The adoption of price stability objectives by countries at different levels of economic development was a major step forward after decades of domestically generated instability. This framework can be credited, at least in part, for the drop in global inflation and the abatement of exchange-rate controversies among the advanced economies.⁴

Now, however, there is growing recognition that the conventional approach to central banking needs to be rethought. Critics reach this conclusion for several related reasons:

- The conventional approach fails to account adequately for financial-sector risk and is therefore too narrowly focused.

- The conventional framework assumes limited or non-existent cross-border spillovers of monetary policies, while in fact spillovers are frequently of first-order importance. They can complicate monetary policy management, accentuate the volatility of real activity and increase financial sector risk.
- The incompatibility of national monetary policies in the face of spillovers is heightened when countries follow different de facto monetary policy regimes (for example, inflation targeting and exchange rate targeting).⁵
- Spillovers may be further accentuated when central banks pursue unconventional monetary interventions (for example, when interest rates are at their floor and constrained by the zero bound). Because of weak domestic demand, as well as distressed banks that are unwilling to lend, the portfolio adjustments prompted by unconventional policies may largely serve to increase capital flows to countries with stronger growth prospects rather than boosting domestic credit as intended.
- High levels of government debt in advanced countries and the slowing growth of traditional export markets for developing countries create new sources of political pressure that central banks will find difficult to ignore.

This chapter starts by considering the validity of these criticisms. It then goes on to ask how central banking theory and practice need to be updated in light of this shift in thinking. The chapter consists of three sections (after this one) followed by the recommendations.

The next section describes how the global financial crisis has recast the debate over central banking. It focuses on the relationship between the traditional focus on price stability and the broader goals of macroeconomic and financial stability. This section also discusses why the traditional separation, in which monetary policy targets price stability and regulatory policies target financial stability, and the two sets of policies operate largely independently of each other, is no longer tenable.

If central banks in fact embrace the goal of financial stability in addition to price stability, monetary policymaking and policy communication will become more challenging. One should therefore consider the practical issues that arise when the central bank is forced to juggle multiple mandates.

Later on in the chapter the authors turn to a criticism of the conventional policy framework: it assumes not just that central banks practice flexible inflation targeting but also that they allow the exchange rate to float freely. Under these assumptions, each central bank has the independence necessary to target price stability and full employment.

The problem is that policy independence in theory may exceed policy independence in practice. In other words, the conventional framework fails to take into account that national policies can have powerful cross-border repercussions that the affected partner may not be able to adequately offset with exchange rate movements. In part this is because the existing system is not, in fact, one of fully flexible exchange rates. In practice, some countries effectively target exchange rates (China's tight management of its currency's value relative to the US dollar being a prominent case in point). In part, it is because international transmission occurs even under flexible exchange rates, through both trade channels and capital flows. The consequences include the prospective re-emergence of global imbalances as well as the proliferation of trade and capital controls when countries seek further insulation from cross-border spillovers.

To analyse these issues, this section provides a global perspective on the evolution of monetary policy and exchange rate regimes. This section examines the incompatibility of certain national regimes with domestic objectives. It then discusses the challenges to reconciling domestic monetary policies with global macroeconomic stability.

This chapter also describes how central banks are being pulled into new roles by the post-crisis environment and by the unavailability of alternative, potentially more suitable instruments. While some aspects of these roles are not new, they nonetheless move central banks into risky territory insofar as central bank actions can inflict collateral damage on domestic financial systems and could heighten new

domestic and international tensions. Two sets of issues are highlighted: (a) the consequences of high levels of public and private debt in the advanced economies and the attendant pressures towards financial repression; and (b) the perceived dangers of currency misalignments and overvaluation, and the attendant pressures towards currency intervention and capital controls.

The final section draws on the analyses in the previous sections to recommend changes in the dominant framework guiding central banking practice. In the framework it is proposed that central banks should go beyond their traditional emphasis on low inflation to adopt an explicit goal of financial stability. Macro-prudential tools should be used alongside monetary policy in pursuit of that objective. Mechanisms should also be developed to encourage large-country central banks to internalize the spillover effects of their policies. Specifically, the chapter calls for the creation of an International Monetary Policy Committee composed of representatives of major central banks that will report regularly to world leaders on the aggregate consequences of individual central bank policies.

While this chapter suggests more responsibilities for central banks, one must also recognize that there is substantial pressure on central banks to acknowledge the importance of still other issues, such as the high costs of public debt management and the level of the exchange rate. These pressures, if internalized, can make central bank objectives hopelessly diffused, but they are not reasons to postpone rethinking the overall policy framework. On the contrary, a framework that is seen as deficient will become an easier political target.

For all these reasons, the authors believe it is time to rethink the existing paradigm. The rest of the chapter lays out what this rethinking should entail.

The Scope of Monetary Policy

This section describes how the global financial crisis has recast the debate over the scope of central banking functions. It focuses on the relationship between the traditional narrow goal of monetary policy – price stability – and the broader goals of macro-economic and financial

stability. The section explains why the traditional separation, in which monetary policy targets price stability and regulatory policies target financial stability and the two sets of policies operate independent of each other, is no longer tenable. It then reviews some practical issues that arise in connection with attempts to coordinate the two sets of policies.

Central Banks and Financial Stability

The global financial crisis shook confidence in micro-prudential tools of regulation as the primary tool for ensuring financial stability. Yet many central bankers still subscribe to the traditional dichotomy between monetary policy and financial stability, except that micro-prudential tools have given way to an embrace of macro-prudential tools of financial regulation (countercyclical capital adequacy requirements, for example). These tools or policies, which mitigate risks to the financial system as a whole rather than solely at the level of the individual institution, are to be developed and implemented by specialists in financial stability, not by central bankers responsible for the conduct of monetary policy.

The case for this separation rests on the belief that interest rates represent too blunt an instrument for the effective pursuit of financial stability. The question is commonly framed as whether the central bank should raise interest rates in response to asset bubbles. In the 1990s and early 2000s, central bankers discussed at length whether and how to respond to asset market developments.⁶ The conclusion of that debate was that central banks had a mandate to react to bursting bubbles but not to target asset prices. Not everyone, however, shared this conclusion. The ‘lean vs clean’ debate remained active in the run-up to the crisis.⁷

The case against attempting to prick bubbles rests on the following arguments:

- Identifying bubbles is hard.
- Even if there is a bubble, monetary policy is not the best tool with which to address it. An asset price bubble will not respond to small

changes in interest rates; only a sharp increase will suffice to prick a bubble. However, a drastic increase in interest rates can cause more harm than good by depressing output growth and increasing output volatility.

The claim that an asset price bubble will not respond to a small change in interest rates has been made in the context of stock market bubbles, where the proposition is most plausible. With the stock market rising by 20 per cent a year, a small increase in interest rates will not outweigh the effects of rapid asset price increases.

However, the stock market may not be the best context in which to discuss the financial stability role of monetary policy. The housing market, with its more prominent role for leverage and credit, and markets in the derivative securities associated with housing investment may be more pertinent. Monetary policy stands at the heart of the leverage decisions of banks and other financial intermediaries involved in lending for housing-related investments. In this setting, even small changes in funding costs may have an impact on risk-taking and funding conditions. Financial intermediaries, after all, borrow in order to lend. The spread between borrowing and lending rates is therefore a key determinant of the use of leverage and has important implications for the interaction between banking sector loan growth, risk premia, and any ongoing housing boom.⁸

Focusing on risk taking by banks and other financial intermediaries will lead the policymaker to ask additional questions about risks to the stability of economic activity. Rather than waiting for incontrovertible proof of a bubble in housing markets, for example, a policymaker could instead ask whether benign funding conditions could reverse abruptly with adverse consequences for the economy. Even if policymakers are convinced that higher housing prices are broadly justified by secular trends in population, household size, and living standards, policy intervention would still be justified if the policymaker also believed that, if left unchecked, current loose monetary conditions significantly raise the risk of an abrupt reversal in housing prices and of financing conditions, with adverse consequences for the financial system and the economy.

Not responding in this way has led to a dangerously asymmetric response to credit market developments. Central banks have allowed credit growth to run free, fueling booms, and then flooded markets with liquidity after the crash, bailing out financial institutions and bondholders. This asymmetry has contributed to stretched balance sheets, with faster lending growth and leverage in times of low-risk premia, more violent deleveraging when risk premia rise, and frequent booms and busts.

For all these reasons, there is a case for central banks to guard against credit market excesses. An inflation-targeting central bank may argue that it does so automatically insofar as higher asset prices boost aggregate demand through wealth effects and create inflationary pressures. However, some additional leaning against credit market developments would be advisable even in the absence of aggregate demand effects once it is determined that funding conditions and reduced risk premia indicate a nascent credit boom. Put differently, inflation-targeting central banks may want to stray below target when conditions are ‘boom-like’ – when rapid asset price growth is accompanied by substantial credit expansion – since policy would otherwise become asymmetric and exacerbate macro-economic volatility.

Retiring the Separation Principle

A consequence of this doctrine of ‘leaning against the wind’ is that the neat Tinbergen assignment of different tools to different objectives becomes more difficult to implement in practice. Interest rates affect financial stability and, hence, real activity. Equally, macro-prudential tools impact credit growth and external imbalances with consequences for macro-economic and price stability. When consumer credit is growing rapidly and the household debt ratio is high, for example, restraining credit growth by changing guidance on loan-to-value (LTV) or debt service-to-income (DTI) ratios over the business cycle will have important macro-stabilization effects.

Rather than viewing the allocation problem as having a corner solution where one instrument is devoted entirely to one objective, the macro-stabilization exercise must be viewed as a joint optimization

problem where monetary and regulatory policies are used in concert in pursuit of both objectives.

Believers in a strict interpretation of Tinbergen separation will fret that blurring the assignment of instruments to targets will jeopardize the central bank's operational autonomy, the central bank's mandate will become fuzzier, and its actions will become more difficult to justify.

These are valid concerns. Central bankers will experience more political pressure than if monetary policy were primarily targeted at price stability. Here, however, it is important to remember that central bank independence is a means to an end rather than an end in itself. Limiting the scope of monetary policy purely for the sake of defending central bank independence risks undermining the institution's legitimacy by giving the impression that the central bank is out of touch and that it is pursuing a narrow and esoteric activity that does not square with its democratic responsibilities.

Ultimately, political reality will thrust responsibility for financial stability on the central bank. As happened in the UK following the failure of Northern Rock, the central bank will be blamed for financial problems whether or not it was formally responsible for supervision and regulation. As lender of the last resort, it will be charged with cleaning up the mess. It follows that it would be better off devoting more of its resources and attention to attempting to prevent the crisis, the elegance and analytical appeal of the Tinbergen principle notwithstanding.

Macro-prudential Policy Tools

Macro-prudential tools are designed to buttress the stability of the financial system as a whole, which is distinct from ensuring the stability of individual institutions. These tools are intended to help mitigate externalities and spillovers at the level of the system as a whole. For example, interlocking claims and obligations create externalities if the failure of one highly leveraged institution threatens the solvency of other institutions and the stability of the entire financial system. Fire sales of assets may magnify an initial shock and lead to vicious circles of falling assets prices and the need to deleverage and sell off assets. Externalities also arise over the course of the cycle if the structure of

capital regulation allows an increase in leverage in financial booms while dampening it in busts.

It is useful to distinguish between different macro-prudential tools that address these different aspects of financial risk. In particular, different tools should be used to address the time and cross-sectional dimensions of risk.

The Time Dimension in Macro-prudential Supervision: In terms of the time dimension, the macro-prudential supervisor should develop a range of tools capable of tempering financial procyclicality. Countercyclical capital buffers, as recommended by the Basel Committee, are a case in point, although they are confined to the banking system. A supplement would be to impose a systemic levy for all levered financial institutions – that is, an additional charge levied on the unstable (non-core) portion of a financial institution’s funding, as suggested by the IMF (2010). This levy could be varied over the life of the cycle.

Restraints on bank lending such as LTV or DTI guidelines could usefully complement traditional tools of bank regulation, such as capital requirements. Capital requirements can themselves consist of a core of long-dated equity or equity-like instruments supplemented with an additional buffer of contingent capital instruments.

The interaction between these prudential measures, as well as their cumulative costs, need to be carefully considered while rolling them out, with a view to adjusting measures based on experience. And governments should guard against the temptation to use such levies as just a revenue-generating mechanism rather than a tool to promote financial stability.

Some measures (for example, capital requirements) are likely to have implications for cross-border competition between financial institutions and therefore may need to be harmonized across countries. This will make it harder to tie them to local economic conditions, for it will have to be done in an objective and mutually agreeable way across countries. Others like LTV or DTI guidance need not be harmonized across countries and could vary substantially with the domestic cycle.

The systemic levy is a form of capital charge, making harmonization important for countries with many cross-border banks, something that will admittedly make it more difficult to tie it to the cycle.

The Cross-sectional Dimension in Macro-prudential Supervision:

In terms of the cross-sectional dimension, policy should focus on systemically important financial institutions (SIFIs). Better resolution regimes to deal with failing financial institutions could reduce the need for reliance on *ex ante* buffers such as capital. Following the near collapse of Northern Rock, United Kingdom was among the first to enact a resolution regime that provides supervisors extensive authority to stabilize a failing institution.⁹ Germany enacted a similar law in January 2011 and the United States is in the process of empowering regulatory agencies to deal with future insolvencies of systemically relevant institutions. An important complication is that many systemically relevant institutions are active across geographical and product borders. These new laws have not been coordinated, and they are unlikely to be adequate for dealing with a large cross-border or cross-market failure. The new resolution regimes consequently do not solve the moral hazard problem implicit in 'too big to fail' (TBTF). It follows that the implicit public subsidy for TBTF institutions remains intact; hence the need for *ex ante* measures.

Macro-prudential tools could be used to reduce this incentive to become too big to fail. They could include a systemic risk tax as suggested by the IMF (2010). Efforts to quantify systemic risk exposure for the purposes of regulation are now underway, but much else remains to be worked out, including who would impose this tax, on whom, and under what circumstances.

Alternatively, surcharges on capital requirements that vary with the systemic risk they create could be applied to SIFIs. The Swiss government commission on TBTF institutions has shown how this could be done. In addition to increasing capital buffers to nearly double the level of Basel III, the Swiss proposal makes the surcharge sensitive to systemic risk, calculated as a function of the balance sheet size and the market share of the institution.

Proposals have also been mooted to eliminate certain activities of SIFIs (for example, proprietary trading), ringfence certain activities (such as retail banking, as discussed in the context of the Vickers Commission in the UK), or even break up SIFIs. There is no consensus among authors of this report on what approach is most appropriate. But in developing all these proposals, care should be taken that they in fact reduce lower systemic risk and do not just shift risk to entities that are less visible to the regulatory authorities (including to entities less capable of managing that risk). Risk that is shunted out of sight in good times comes back to haunt the system in bad times.

Finally, supervisors need to identify direct and indirect exposures and linkages, cross border as well as national, in order to make supervision more effective. They need to identify institutions and trades where activity is disproportionately concentrated. While collecting the relevant data (on, for example, inter-bank derivative exposures) for their own supervisory needs, they should also disseminate more aggregated information to market participants and the general public. Such dissemination will allow market participants to manage risks better and allow the public in turn to better monitor supervisory behaviour. While individual countries now have efforts underway to collect and disseminate data (for example, the Office of Financial Supervision in the United States) they are still some distance from effective cross-border data collection and sharing.

Institutional Responsibility

Who should be responsible for financial stability at the national level?¹⁰ There are two answers to this question. The coordinated approach gives multiple institutions (central bank, systemic risk boards, micro- and macro-prudential supervisors) interlocking mandates, their own instruments, and a directive to cooperate. In contrast, the unified approach vests one institution, possibly the central bank, with multiple mandates and instruments.

The coordinated approach dominated prior to the financial crisis and, despite its failures, has largely survived the reform process. In countries like India and the United States, administrative bodies have been set up

to coordinate the efforts of multiple supervisory and regulatory bodies, although these bodies tend to lack enforcement power. In Europe, the push for greater regional coordination has been further complicated by the superimposition of an additional layer of supervisory institutions with few powers of their own. Supervisory colleges, which collect relevant home and host-country supervisors of a large cross-border institution, are one of the tools for coordination among countries. But overall, the problem of incomplete coordination remains.

In particular, the problem that EU-wide banks are still largely supervised by national regulators is yet to be fully solved. A new body, the European Systemic Risk Board (ESRB), has been charged with macro-prudential supervision but is endowed with only weak powers and few effective instruments. The ESRB is large and unwieldy, comprising the central bank governors and financial supervisors of every EU country, plus a number of other functionaries. Moreover, the ESRB can only issue recommendations and has no enforcement powers.

While there is little consensus as to the best model, the authors' contention that financial stability should be a core objective of the central bank increases the weight of arguments for giving central banks primary responsibility for regulatory matters. If central banks have a mandate to ensure financial stability and also the powers needed to wield macro-prudential corrective instruments, they can optimally choose trade-offs between the use of the interest rate instrument and macro-prudential measures. Moreover, the central bank will have, or should have, its finger on the pulse of financial markets through its monetary policy operations. It possesses a staff with macro-economic expertise. It is the one institution with the balance sheet capacity to act as lender of the last resort.

There are also compelling arguments against a unified model. One disadvantage is that it makes the central bank more susceptible to political interference. The central bank will have to work hard to establish the legitimacy of its actions in circumstances where the nature of threats to financial stability may be poorly understood and its actions are unpopular. The public and its elected representatives may not be happy, for example, if the central bank curbs credit growth

and causes asset prices to fall, and they will pressure the authorities to reverse course.

The unified model may also pose a conflict of interest for the central bank, which may, for example, be tempted to keep interest rates artificially low in an effort to aid distressed financial institutions, or to treat a bank facing a solvency problem (a matter properly addressed by the fiscal authority or its agents) as if it were facing a liquidity problem.

If, on balance, the decision is to make the central bank the macro-prudential supervisor, it should go hand in hand with measures to strengthen its independence from political pressure. To this end, it is important for the central bank to participate in the public discussion on how its performance will be evaluated. More regular communication of the rationale for its policies will also become increasingly important.

In sum then, there are advantages to both models, and individual countries' institutional characteristics and political settings will determine what works best. Whatever the mechanism, it is clear that effective coordination between monetary and financial regulatory policies will be the lynchpin of financial stability.

Exchange Rates and Monetary Policy

The external dimension of monetary policy is critically important for small open economies with open capital accounts. Capital flows and exchange rate movements are important for price-level developments. They are important for financial stability as well: in open economies, monetary policy may have limited effectiveness in influencing credit developments because, *inter alia*, financial intermediaries can substitute external funding for domestic funding.

Macro-prudential tools that lean against credit developments can give the central bank some measure of monetary policy autonomy, weakening the link between domestic monetary policy and capital inflows. For instance, by leaning against credit expansion, the central bank may be able to reduce the incentive for banks to borrow externally when domestic interest rates are increased.

The tensions between these different facets of economic stabilization can become more acute when the currency is strong relative to

fundamentals and the government wants to prevent excessive appreciation. This puts the central bank in a corner when domestic demand is also too strong. There is then the need to cool an overheating economy by allowing the appreciation of the currency, on the one hand, but pressure to guard against the erosion of competitiveness from what might prove to be only a temporary appreciation, on the other. Capital controls that moderate financial inflows, especially short-term inflows that are channelled through the domestic banking sector, may alleviate the policy dilemma but their role as a legitimate part of the policymaker's toolbox remains controversial.

Much commentary takes for granted that 'capital controls don't work.'¹¹ Commentators making such claims typically assume that the objective is either to hold down the exchange rate or to suppress the total volume of inflows. In this approach the emphasis is on the exchange rate's influence on the trade balance and thus also the attempt to hold back currency appreciation by limiting financial inflows, whatever their precise form.

But if capital controls and related macro-prudential measures are seen not as instruments of exchange rate management but as part of a package of policies targeted at financial stability, then it is the composition of capital flows that takes centre stage rather than their volume.¹² Foreign direct investment (FDI) and portfolio equity flows are less likely to reverse direction abruptly. And even when portfolio flows do reverse, the impact on funding may be less damaging than any sudden loss of access by the banking sector. Foreign sellers of stocks in a crisis face the double penalty of lower local currency prices when they sell and a sharply depreciating exchange rate, the implication being that the dollar-equivalent outflow associated with repatriation of portfolio equity sales proceeds tends to be small compared to the pre-crisis market-to-market value of foreign holdings of equity. And the typical equity investor (such as a pension fund or mutual fund) is not leveraged.

In contrast, when foreign funding of the banking sector evaporates abruptly, the consequences are more damaging. If the local bank is leveraged and the debt is denominated in dollars, then outflows can

set off the well-known cycle of distress in which belated attempts by banks to hedge their dollar exposure drives down the value of the local currency, making the dollar-denominated debt even larger.¹³ If the crisis erupts after a long build-up of such mismatches, the coincidence of the banking crisis with the currency crisis (the 'twin crisis') can undermine banking sector solvency, with significant economic costs.

Capital controls are not, of course, the only tool for dealing with inflows. Micro-prudential tools such as minimum capital ratios should be part of the policy response. Even these tools, however, may not be enough to dampen the upswing of the cycle. Bank capital ratios often look strong during booms when banks are profitable and the measured quality of loans is high. In addition, the application of discretionary measures, such as higher capital requirements, must surmount concerted lobbying by vested interests that benefit from the boom.

Currency appreciation may also help to moderate the size of capital inflows, as foreign investors perceive less of a one-way bet. However, when banking sector flows form the bulk of the inflows, merely allowing the currency to appreciate may not suffice. The behaviour of banks and other leveraged institutions is additionally influenced by their capital position and their perception of risks. Currency appreciation and strong profitability coupled with tranquil economic conditions can be seen by banks as a cue to expand lending rather than to curtail their activity.

In sum, capital controls can, under some circumstances, be useful for managing maturity and currency mismatches and, in particular, for forestalling dollar shortages in the banking system. Judiciously employed along with other macro-prudential policies, they can reduce financial instability as well as boom–bust cycles, thereby serving as a useful complement to conventional monetary policy instruments. As with other instruments, care should be taken that they are used to reduce macro-economic volatility rather than merely to suppress it, only to see it emerge in other, potentially more destructive ways. Moreover, with capital accounts becoming more open and given the increasing fungibility of funds across different forms of capital, even controls limited to specific types of capital flows are becoming an

increasingly weak substitute for good macro-economic and prudential policies.

Concluding Remarks

This section has made the case for augmenting the traditional narrow price stability focus of monetary policy with the additional goal of financial stability. The conventional separation in which monetary policy targets price stability and micro-prudential policies target financial stability, and the two sets of policies operate independently of each other, is no longer tenable.

This has a number of implications.

- Policymakers need a new set of policies that are macro-prudential in nature, targeting the build-up of risks to financial stability. These policies range from countercyclical capital ratios to capital controls.
- The neat Tinbergen separation of two tools for two objectives is no longer feasible. Interest rates affect financial stability and, hence, real activity. Equally, macro-prudential tools impact credit growth and external imbalances, which have consequences for macro-economic and price stability. Central bankers therefore will have to consider trade-offs as they optimize among their policy tools to achieve their multiple objectives.

The authors believe that explicit recognition of such trade-offs will, in some cases, move theory closer to practice. In other cases it will make adopting inflation targeting more attractive insofar as the framework now recognizes issues that some policymakers hitherto thought were missing. And in the case of the few who still adhere to narrow inflation targeting, it might prompt a welcome reconsideration.

Cross-border Spillovers

The last section discussed how national monetary policy frameworks should be rethought to better incorporate financial-stability considerations. But there is another equally important reason for rethinking the framework: international spillovers.

If national policies have important cross-border effects, then there is a *prima facie* case for coordinating them internationally. This observation was of course the main point of the voluminous 1980s literature on spillovers and policy coordination. But it has since been rendered more compelling by changes in the world economy in the last quarter century. The world today is more connected than ever by cross-border financial flows. The policy choices of individual countries, especially those of large, systemically significant countries, can have a substantial impact on their neighbours. When governments and central banks change their macro-economic policy stance dramatically, as they did in the recent world financial crisis, the spillovers on other nations can be sizeable.

Cross-border spillovers may also have increased as a result of the nature of policy responses to economic shocks and business cycle conditions. A commonly voiced concern is that unconventional monetary policies may have especially large and complex cross-border spillovers. For instance, monetary injections when the nominal interest rate is at its zero bound might result in capital outflows rather than in supporting domestic activity, if domestic demand is weak and banks are reluctant to lend.¹⁴

While concern in the 1980s centred on the interaction of the United States and Europe, two economic blocs with floating exchange rates, spillovers today involve one bloc that floats – the major advanced countries – and one, led by China, with fixed or semi-fixed exchange rates. This asymmetry gives rise to important new issues.

This section reviews various channels for international transmission of domestic policies and discuss their implications. It then discusses the tensions that arise in reconciling domestic monetary policies with the larger objective of global macroeconomic and financial stability.

Cracks in the Framework of (Mostly) Flexible Exchange Rates

The international properties of the *de facto* regime of flexible exchange rates were never as desirable as asserted by its champions. To start with, the new regime was not, in fact, universally adopted. It was not widely adopted in Asia, for example, where *de jure* or *de facto*

pegging remained the reality and a large volume of foreign exchange reserves was accumulated in the 2000s, contrary to the presumption that reserves would become superfluous with the breakdown of the Bretton Woods system of fixed exchange rates.

Moreover, large current-account surpluses and deficits ('imbalances') persisted over much of the last decade without prompting macroeconomic and exchange-rate responses. Imbalances persisted in countries with very different exchange rate arrangements, including countries that did not maintain dollar pegs, such as Japan and Germany.

Questions also remained about the ability of inflation targeting cum floating exchange rates to cope with the volatility of international capital flows. While stability-oriented monetary policies at the national level could help to limit the magnitude of sudden inflows and reversals, and while strong regulatory and supervisory frameworks could help limit their consequences, it was unclear whether such measures would be sufficient to protect emerging economies from macro-economic and financial instability.

Nor did the IT-floating framework eliminate the special role of the dollar as the key international currency. The dollar remains the world's most important reserve currency and a leading invoicing currency for international trade. It is also the currency that underpins the global banking system as the funding currency for global banks. This raises important questions about access to dollar liquidity by non-US banking systems in times of stress.¹⁵

Reconsidering the Conventional Wisdom

In light of the financial crisis and subsequent developments, several reasons have emerged for revisiting the conventional wisdom:

- *Convergence towards the inflation targeting cum flexible exchange-rate framework remains incomplete.* While a large part of the world economy has adopted this model, some fast-growing emerging markets have not. The coexistence of floaters and fixers therefore remains a characteristic of the world economy. It can even be said that the incidence of pegging has risen over time with the export

drive of East Asia and, toward the end of the most recent decade, the rise of the relative price of oil.

- *The period in which the IT regime was tested was exceptionally benign.* China's entry into global trade and other emerging markets acted as a strong disinflationary force, making for price stability globally. Commodity prices remained subdued until the late 2000s, and there were few inflation spillovers. Since then the situation has changed. In a new context where commodity prices respond strongly to aggregate demand, a major question is whether central banks take into account spillovers through global commodity prices when making monetary policy decisions.
- *Capital market spillovers between advanced and emerging economies have grown.* While Obstfeld's (2009) characterization of the world economy as comprising a single financial system may not apply to all countries, it is certainly correct for North America, Europe, East Asia, and a number of emerging market countries. Private gross capital flows to and from both US and Europe grew massively in the course of recent decades. To be sure, this was in large part for reasons independent of monetary policy, including financial liberalization, the unique role of the US as a supplier of safe financial assets, and the attractiveness of emerging markets as destinations for investment. Still, the resulting financial interpenetration implies that the stock of diversifiable assets and cross-border holdings that respond to changes in monetary conditions have grown enormously.¹⁶ This creates challenges for countries on the receiving end of capital flows. In practice, many of those recipients are emerging market economies that are struggling to prevent the surges in capital inflows from leading to exchange rate misalignment and unsustainable lending booms.
- *Unconventional monetary policies are likely to accentuate international spillovers.* Such policies are typically undertaken when traditional instruments are exhausted and traditional channels have ceased to work. In such situations, unconventional policies could result in less domestic demand creation and more demand shifts between countries. Critics argue that purchases by central banks of long-

dated bonds and private-sector-issued securities create liquidity that can spill abroad (because domestic channels for credit creation are blocked), causing capital flows to and undesirable relative price changes in other countries.¹⁷ Central banks in countries conducting quantitative easing – the US Federal Reserve and the Bank of England – argue that Quantitative Easing (QE) is no different conceptually from conventional monetary policy but merely its continuation through other means in a situation where interest rates approach the zero bound. Central banks in several emerging market countries, in contrast, claim that QE is a beggar-thy-neighbour strategy.

These observations suggest that convergence towards a common policy template in the 2000s was not general. Moreover, where convergence did take place, it may not last long in view of the challenges currently confronting monetary policy. It is therefore important to assess whether a reformed consensus can and will be formed and to contemplate its implications for the conduct of monetary policy and for the ‘own house in order’ doctrine in particular.

Challenges to the Inflation Targeting-plus-floating Regime

Uneasy coexistence of floaters and fixers: The idealized IT-plus-floating framework has not worked out as anticipated, because countries have not converged to similar monetary and exchange rate arrangements.

In Latin America, a substantial number of countries, some of them large and economically important, resist moving in this direction. While the two largest countries – Brazil and Mexico – and an important set of middle-sized and small nations – Colombia, Peru, Chile, Uruguay – have adopted it, another sizeable group including Venezuela, Argentina, Bolivia, and Ecuador continues to pursue fixed or semi-fixed exchange regimes, sometimes with multiple exchange rates for different current and capital account transactions. Few countries in the Middle East and Africa have converted to IT plus floating, though economically important South Africa has adopted it.

In Asia, several countries have adopted the framework, albeit with different degrees of commitment. Inflation targets are explicit in Thailand, Korea, Indonesia, and the Philippines. In Thailand and Korea, low and stable inflation was achieved in the 2000s. Singapore has achieved low and stable inflation using a basket-based exchange rate regime, since the economy is small and highly open to financial flows. Usually, however, Asian central banks have multiple objectives: growth, price stability, and exchange rate stability, some of which temper the conventional framework. It is fair to say that many East Asian countries deal with inflation more on the basis of discretion than pre-set rules. In Cambodia and Vietnam, dollarization and the lack of independence of the central bank is a serious problem in stabilizing inflation. India has a hybrid regime without an explicit inflation objective and with exchange rate management in principle limited to moderating sharp movements in the currency's value.

China is the largest nation with a managed exchange rate. The renminbi was delinked from its US dollar peg in 2005 but remains tightly managed against the dollar. Among the explanations for this choice of exchange rate regime are the government's objective of promoting export-led growth. Another is the desire to self-insure against external shocks by accumulating a large stock of reserves. China's foreign exchange reserves now exceed \$3 trillion, dwarfing by a wide margin all evaluations of the reserve buffer necessary to insure against sudden stops of inflows or a surge of capital outflows.

National and regional differences aside, a common feature of policies in these countries is a reluctance to allow exchange rates to move as much as needed to accommodate external disturbances, especially those originating in the capital account. Non-floaters monitor nominal and sometimes also real exchange rates and use not just foreign exchange market intervention but a whole array of instruments to prevent unwanted exchange rate movements.

To sum up, notwithstanding the perceived success of inflation targeting with flexible exchange rates, countries operating a freely floating exchange-rate regime, whether measured in terms of global

GDP or global exports, have not increased over the last two decades. To the contrary, the share of such countries, so measured, has actually declined.

The main consequence is that the adjustment mechanism implied by the standard IT-plus-floating arrangement has not been allowed to operate. This is one explanation for the size and persistence of global imbalances. According to the IMF's *World Economic Outlook* (WEO), these imbalances reached 3 per cent of world GDP in 2007, before the advent of the crisis.¹⁸ The subsequent crash then reduced current account deficits in countries such as the US and UK as their demand for imports dropped sharply. But according to the April 2011 WEO, imbalances once again began to grow starting in 2010 and will hover around 2 per cent of world GDP between now and 2016.

A prominent instance of the uneasy coexistence of floaters and fixers is the tug of war between US monetary policy and exchange rate policy in emerging market 'fixers' such as China. A highly stimulative US monetary policy is potentially fueling inflation elsewhere, including in emerging markets that have closed their output gaps and are facing inflationary pressures. Of course, emerging market central banks could raise interest rates more rapidly, but they would then attract capital inflows and experience faster exchange rate appreciation. Meanwhile, emerging market resistance to exchange rate appreciation is limiting export and employment growth in industrial countries already experiencing high and persistent unemployment. In normal circumstances, the United States and other advanced economies would adjust by cutting interest rates. But these countries are already at the zero bound. In this context, the exchange rate policy of emerging market 'fixers' is imposing a negative demand externality on the advanced economies. In tandem with the inflationary externality imposed by US monetary policy, this has created severe policy complications for other countries, especially emerging markets that are floaters.

Collective action problems arise from these asymmetric exchange rate arrangements. Many emerging market countries in East Asia, even those that ostensibly float, explicitly or implicitly monitor their real

exchange rates. They are reluctant to see their currencies appreciate excessively, especially relative to other countries in the region. This reluctance hinders nominal exchange-rate adjustment between East Asia and the advanced economies at a time when asymmetries between the two groups urgently call for real exchange-rate adjustment.

Concerns about exchange rate appreciation and overshooting are not limited to the emerging markets, of course. The recent intervention in foreign exchange markets by committed floaters such as Japan and Switzerland highlights the tensions building up in the global economy as public debt levels in the major reserve currency areas – the US and Europe – impose more of a burden on the Federal Reserve and the European Central Bank to maintain lax monetary policy with attendant spillovers to the rest of the world (as discussed in more detail in the next section).

Fixing also creates policy dilemmas for countries seeking to fix. These countries are by choice dependent on their partners' monetary policy decisions, especially but not only when they have opened the financial account. Attempting not to import foreign monetary conditions while fixing has required extraordinary measures.

Take China, whose capital account is only partially open. Experiencing large balance of payments surpluses, the People's Bank of China (PBOC) has regularly intervened in the foreign exchange market to limit the appreciation of the renminbi. The resulting increase in China's foreign exchange reserves accounts for almost all the increase in China's monetary base. To sterilize the increase in the money supply created by its intervention in the foreign exchange market, the PBOC has been forced to sell all of its holdings of government securities and to sell central bank bills to state-owned commercial banks. This strategy has been abetted by repressed interest rates, creating distortions in financial markets and in effect taxing households who receive negative real returns on their massive stock of bank deposits.

The financial crisis heightened these tensions. Its size and depth increased the incentive for emerging markets experiencing sharp capital flow reversals to self-insure by accumulating even larger

reserves.¹⁹ Moreover, the instability of world demand has caused a number of countries, not all of them in Asia, to place an even greater premium on managing the level of the real exchange rate. This has led them to deploy a broad array of tools, including capital controls, to prevent unwanted appreciation (for a more detailed discussion on this issue, see the next section).

There are two possible assessments of these trends. One minimizes the importance of the asymmetry of exchange rate policies on the grounds that what matters for international adjustment is real exchange rates, which governments cannot control in the long run. Thus, recent price and wage inflation in China is causing non-trivial appreciation of the renminbi in real terms vis-à-vis the dollar even while the nominal bilateral exchange rate remains relatively stable.

The alternative view, which is commonly shared, is that international adjustment via wage and price inflation is slow and inefficient. The world economy would be better served by a speedier mechanism involving greater exchange rate flexibility. If flexibility is not feasible for domestic political reasons, then incentives need to be put in place to make sure large nations among both groups – fixers but also floaters – internalize the international effects of their actions.

Controlling Inflation in a Less Benign Environment: For the second time in three years, rising commodity prices are fuelling global inflation. This inflationary pressure is superimposed on the background of still-large output gaps and high unemployment in virtually all advanced countries. This combination is problematic for an inflation-targeting strategy in which central banks focus on the components of inflation that are under their direct control. Indeed, for central banks in commodity-importing countries, a rise in oil or commodity prices is an exogenous supply shock, and the standard model says that the central bank should only respond to the extent that the shock has second-round effects and increases expected future inflation.

Targeting domestically generated inflation was an appropriate strategy and did not raise collective action problems in the 1990s and the early 2000s, when an ample supply of commodities and the entry

of China and other developing countries into the global labour force helped subdue global inflation. Against the background of a steep global commodity supply curve, however, expansionary monetary policies by major economies, advanced and emerging alike, may create negative externalities that are not adequately internalized in the standard framework.

This shortcoming is especially evident in the strict inflation-targeting framework in which the central bank commits to keeping the forecast rate of inflation (conditional on market expectations for the policy rate) on target. In this setting, the global environment is taken as given and is not affected by domestic monetary policy responses. As a consequence, the global monetary policy stance is likely to be suboptimal.

In small open economies, monetary policy is reasonably geared to domestic objectives. The same, however, does not apply to the large-economy central banks, such as the Fed, the ECB, and the PBOC. These economies are large enough for their policy choices to involve significant externalities. It would therefore be desirable that these central banks, and perhaps a handful of others, include in their policy objective a measure of these effects. Clearly, however, such a move would involve a collective-action dimension, which calls for an explicit dialogue among these central banks about the amendment of their policy frameworks.

Financial channels of transmission: In the idealized world in which all central banks pursue IT and allow their exchange rates to float, an individual central bank's monetary policy actions – say, a cut in the interest rate – are transmitted to the rest of the world mainly through two channels:

- The cut in local interest rates stimulates domestic demand, some of which spills over to additional imports. The magnitude of this effect on the rest of the world depends on the country's share of world GDP.
- The country's nominal and real exchange rates depreciate, shifting demand away from the rest of the world. Again, the size of this cross-border effect depends on the size of the country in question.

In this stylized model, capital flows only have an indirect role, with the potential for outflows from the country undertaking an expansionary monetary policy causing movements in the value of its currency. Prices bear the burden of adjustment.

In contrast, recent experience points to the existence of additional channels whose role and impact may well be large and potentially destabilizing. While the fact that the impact of capital movements can dwarf that of the more traditional trade effects has long been understood, the new and novel observation concerns the size of the cross-border capital movements triggered by the supply of liquidity or small changes in interest rates in advanced countries. This reflects the accumulation of a huge pool of footloose assets responsive to small changes in expected returns.

The composition of these investment portfolios is interest-rate sensitive and likely to respond sharply to differences in expected rates of economic growth in recipient countries. An example is the massive capital flows to emerging markets in 2010 in response to the growth slowdown and record-low interest rates in major advanced countries.

Policy spillovers to the rest of the world can be sizeable in the case of the United States, which hosts branches of some 160 foreign banks whose main function is to raise wholesale dollar funding in capital markets. Foreign bank branches collectively raise over one trillion dollars of funding, of which over six hundred billion dollars is channelled to their headquarters outside the United States.²⁰

Although the United States is the single largest net debtor, it is a substantial net creditor in the global banking system. In effect, the US borrows long through the issue of treasury and other securities while lending short through the banking sector. This is in contrast to countries like Ireland and Spain that financed their current account deficits through their respective banking sectors, which subsequently faced runs by their wholesale creditors.

Some borrowed dollars will find their way back to the United States. But many will flow to Europe, Asia, and Latin America, where global banks are active local lenders. At the margin, the shadow

value of bank funding will be equalized across regions through the portfolio decisions of global banks, making global banks the carriers of dollar liquidity across borders. In this way, permissive US liquidity conditions are transmitted globally and US monetary policy becomes the global monetary policy.²¹

An additional channel of transmission is through commodity prices. Low interest rates in the G3 countries (US, Japan, Euro area) have a tendency to push up primary-commodity prices, both because the associated low borrowing costs mean high consumption and investment demand for these products, including from emerging markets, and because a low interest rate reduces the financial cost of holding stocks of storable commodities, thus making them more attractive as investment vehicles.

From the perspective of a commodity-producing country, lower world interest rates thus improve the terms of trade and increase local wealth and creditworthiness. A rating upgrade may follow. All this makes the country even more attractive for footloose international capital, creating pressures for currency appreciation.

These cross-border effects can be magnified by differences in exchange rate regimes. In recipient countries with freely floating exchange rates, standard theory suggests that the local currency should appreciate in response to a cut in foreign interest rates. It could even appreciate beyond its new steady-state level on impact, before depreciating until reaching its new equilibrium level.

But if the country in question has a managed float or semi-fixed exchange rate, the required appreciation will not occur on impact. Even so, expectations of appreciation will eventually set in, making it more attractive to shift capital towards the country. This may bring forth additional inflows, in turn creating additional pressure for the exchange rate to strengthen.

The situation is even more complicated if intervention in the foreign exchange market is sterilized. The need to issue local bonds to mop up the liquidity resulting from the purchase of foreign exchange may cause local interest rates to rise, attracting even more inward capital

flows. Since local interest rates are likely to be higher to begin with (if the recipient country is an emerging market), this sterilization will be expensive. If sustained over a sufficiently long period, sterilized intervention can weaken fiscal accounts, causing expectations of monetization and higher inflation, which in turn will cause local nominal rates to go up. This, in turn, can call forth yet another round of destabilizing capital inflows.

The conventional view of international spillovers has also relied on the assumption of smoothly adjusting international capital markets, something that seems less than tenable today. The 2007–09 financial crisis serves as a reminder that financial flows can reverse abruptly, placing intense pressure on the functioning and integrity of markets and market participants. This has been pointed out repeatedly after recent capital-account currency crises in Mexico, Asia, Russia, Brazil, and Argentina. What is new in the 2007–09 crisis was that it happened even in some advanced countries, for example, some European economies, such as Ireland.

A nation previously flooded with capital can, thus, become the subject of a sharp reversal in flows. Margin and borrowing constraints can suddenly become binding, leading to a painful process of deleveraging. If the need to raise cash causes one round of asset sales, the prices of those assets will fall, reducing the value of collateral and calling forth further asset sales and additional price drops. This can cause massive destruction of value, as firms find themselves liquidity constrained and abandon unfinished potentially profitable investment projects.

Policymakers in countries on the receiving end of these flows face an unappetizing choice. If they allow the currency to appreciate, they expose themselves to accusations of overvaluation, loss of competitiveness, and deindustrialization. But if they fight the appreciation via intervention, they may find themselves on the receiving end of ever-increasing inflows. The central bank may end up allowing some appreciation anyway, but not before accumulating a large stock of expensive domestic liabilities and a large stock of

international reserves on which it will take a capital loss (in domestic currency terms) if and when the exchange rate adjustment eventually happens.

While the conventional model of IT-plus-floating acknowledged these complications, it did not place them at the centre of the analysis. To the extent countries targeted core inflation, spillovers through global commodity prices were left unattended. This was not a serious concern in the 1980s and 1990s, the period of the Great Moderation, but is a more serious one in the presence of large global imbalances and the need to accommodate large stocks of internationally mobile capital 'looking for yield.'

Normal versus crisis times: The conventional wisdom was developed in tranquil times. In crises, in contrast, central banks have resorted to an array of non-conventional monetary policies such as quantitative easing (QE) – the printing of money to buy bonds. What do such policies imply for the question of international spillovers of monetary policy?

One view is that unconventional policies are no different from conventional policies in their cross-border implications. If floating exchange rates can adjust to make international coordination of conventional policies unnecessary, then the same must be true of unconventional policies. This was the view of the United States following the adoption of QE2. In response to complaints from emerging market policymakers who feared the wave of liquidity coming their way, Fed officials essentially argued that, 'everything will be okay if you just let your currencies appreciate.'²²

The alternative view is that beggar-thy-neighbour impacts are greater when using unconventional instruments. The difficulty arises in evaluating whether the use of such instruments is consistent with the normal policy framework or represents an attempt mainly to weaken the currency and boost exports in the absence of a positive domestic demand response. The same causes that justify recourse to unconventional policies make the inflation-targeting compass lose precision. When inflation significantly undershoots its target

and central banks resort to instruments with which they have little experience, it is much harder to say whether a policy stance is in line with the IT framework or whether it represents an attempt at competitive devaluation.

In addition, spillovers may work differently in times of crisis. During a crisis, local credit demand is likely to be weak and banks' willingness to lend domestically will be especially limited. For every additional dollar of liquidity that is created by monetary policy, a larger share will end up abroad in times of crisis than in normal times, thereby depreciating the exchange rate at the expense of trade partners. It follows that spillovers are potentially larger during episodes of local financial distress.

The presence of international spillovers suggests that coordination can lead to better global outcomes. In addition, the current situation highlights the need for principles and procedures for deciding when an unconventional monetary policy is beggar-thy-neighbour in its effect. In turn, these principles should form the basis for corrective action.

Conclusion

The cross-border spillovers from monetary policy provide yet another reason for rethinking not just the domestic monetary policy framework but also mechanisms for ensuring compatibility between large-country policies. This last section will turn to recommendations that follow from this analysis in the final section. But before offering recommendations, this chapter turns to a discussion on some additional policy burdens on central banks in the aftermath of the crisis.

Additional Pressures on Central Banks

This section describes how central banks are coming under additional pressures in the post-financial crisis environment. While some of these additional pressures are not entirely new, they threaten to force central banks onto risky terrain.

Two sets of pressures have been highlighted: (a) the consequences of high public and private debts; and (b) the perceived dangers of currency appreciation and overvaluation.

While manifestations of these pressures are already evident in individual countries, it is important to understand them as part of a broader global picture. This is done in the next two sections, which look at the consequences of high public and private debts in the advanced economies and at worries about currency misalignments and overvaluation in emerging markets, respectively. Following this positive analysis (which asks what kinds of new pressures central banks will find themselves subject), the concluding section turns to the normative dimension (the question of how central banks should respond).

Central Banks and the Debt Overhang

High levels of public debt are likely to be the most enduring legacy of the 2007–09 financial crises for the United States and other industrial economies. For many if not most advanced countries, concerns about those debt burdens will shape policy choices for years. Fiscal adjustment is painful in the short run, which makes it politically difficult to deliver. Debt restructuring, for its part, leaves a damaging stigma and is also often associated with deep recessions.

Importantly, debt overhangs are not limited to the public sector, as was the case following World War II, but include a high degree of leverage in the private sector, especially in the financial industry and households.²³ The surge in domestic bank credit that occurred in most advanced economies in 1997–2007 has barely begun to unwind. The build-up in external leverage was even greater, with Iceland and Ireland recording gross external debt positions in excess of ten times their respective GDPs. The debt overhang and associated problems are common to most advanced economies.

An unsustainable path for the public debt ultimately needs to be addressed. In some countries this will require an extended period of primary budget surpluses. In others it will require debt restructuring. The authorities will of course be reluctant to term their actions restructuring; they will prefer the pretense that they are finding uniquely advanced economy solutions for what are, in reality, emerging market style sovereign debt crises. Just as in other debt

crises-resolution episodes, their responses will include debt buybacks (as in Greece) and debt-equity swaps.

Another option, which seemingly holds out the attraction of avoiding some of the aforementioned costs or at least spreading them over time, will be to attempt to limit the effective cost of debt by requiring domestic financial institutions to hold it. While advanced economies are unlikely to call their policies financial repression when more politically correct characterizations, such as prudential regulation, are available, they could move to a system more akin to what the global economy had prior to the 1980s market-based reforms. That system of domestic and external financial regulation was instrumental in keeping real interest rates low (and often negative) and reducing advanced economies' government debt levels from their record highs at the end of World War II.

Some recent moves suggest governments might attempt similar measures today. Basel III provides for the preferential treatment of government debt in bank balance sheets via substantial differentiation (in favour of government debt) in capital requirements. Other approaches may be even more direct. For example, at the height of the financial crisis, UK banks were required to hold a larger share of gilts in their portfolios. The IMF's April 2011 *Global Financial Stability Report* documents how Greek, Irish, and Portuguese banks have already liquidated a substantial fraction of their foreign assets and swapped those into domestic public debt.²⁴ Evidently, the process whereby debts are being 'placed' at below market interest rates in pension funds and other more captive domestic financial institutions is already underway. Spain has recently reintroduced a *de facto* form of interest rate ceilings on bank deposits.^{25,26} At the same time, however, it remains to be seen whether governments have the ability to go much further in today's financially-sophisticated, high-capital-mobility world.

If governments do embark on this path, central banks are likely to come under pressure to be part of this process, as they were in the period after World War II. In many countries, central banks are financial regulators, so the impetus for, or at least acquiescence to, measures compelling other financial institutions to hold government

bonds will have to come from the central bank, and the central bank will come under political pressure to provide it. The central bank may also come under pressure to support bond prices – or equivalently, to cap interest rates on treasury bonds – as was the case in United States prior to the Treasury-Federal Reserve Accord of 1951 that restored the Fed’s operational independence. The European Central Bank has already engaged in limited purchases of the government bonds of heavily indebted Euroarea countries and is under pressure to undertake more, with the effect of transferring sovereign obligations onto its own balance sheet.

The normative question (which is addressed in the concluding section to this section) is whether, under what circumstances, and how far the central bank should go down this road. As discussed earlier, the conceit behind central bank independence and inflation targeting is that monetary policy can and should target price stability alone, while other economic objectives are best addressed with other instruments and by other agencies. But in a second-best world, where other instruments are ineffective or constrained and where uncertainty prevails, this neat separation breaks down. Under these circumstances, central bankers need to ask whether, *inter alia*, undertaking bond purchases, while creating moral hazard for their governments, interfering with the conduct of conventional monetary policy, and sending mixed messages, is better or worse than standing by idly and potentially forcing the debt to be restructured, already weak banks to take a haircut, and, in the worst case, financial market meltdown to occur.

This debate has taken on a particularly sharp edge in the context of the unfolding European sovereign debt crisis. As the public discussions among different official players in that context vividly illustrate, the right answers are far from obvious and outcomes are intimately tied to political rather than just economic considerations. It is also unlikely that the same answer to these questions will be correct under all circumstances.

Central bankers face a difficult dilemma. The more they take these competing objectives on board, the more they depart from the intellectual framework that guides their action, and the more

complicated their task becomes. But when they overlook such spillovers in the name of monetary purity, they begin to be viewed as part of the problem and they risk undermining the political consensus that underpins their independence.

Dealing with Currency Misalignments and Overvaluation

Another area where this dilemma is experienced is in the relationship between monetary policy and trade competitiveness. Central banks frequently come under pressure from exporters, industrialists, and agricultural interests who complain that their focus on domestic price stability and neglect of the exchange rate comes at the expense of the profitability of key sectors. In emerging markets, the typical pattern is for an upswing in expectations to cause capital inflows that in turn strengthen the exchange rate, squeezing tradable economic activities. In advanced countries, similar problems can arise as a result of safe-haven flows and economic problems abroad (see the recent cases of Switzerland and Japan).

Central banks have traditionally responded to capital inflows with sterilized intervention and various forms of capital-account regulation. But sterilized intervention that results in the build-up of reserves is costly and ultimately self-defeating when financial markets are open. Unsterilized intervention (quantitative easing) may help where there is no existing problem of inflation (Switzerland, Japan), but it is problematic in the booming emerging-market setting, where inflation and overheating risk already exist (see, however, Turkey for an experiment along these lines). There has been an increased tendency, therefore, in emerging markets to resort to controls of various types. Now that such measures are no longer under attack by the IMF, more countries have become willing to discuss and institute them: Brazil, Thailand, and Korea being cases in point.

It is easy to dismiss pressure from exporters as self-interested lobbying. However, there may also be some broader validity to their claims. The share of employment in manufactures tends to shrink as a country moves through middle-and high-income status. But very sharp appreciation of the exchange rate can

accelerate that process, with disruptive effects. Workers with industry-specific skills and training may find it hard to redeploy them elsewhere. A long-standing comparative advantage can be undermined. Recall, for example, discussions on how the high dollar in the mid-1980s was creating a Rust Belt in the Midwest and of how a strong franc currently threatens to hollow out Swiss industry.

Some of these arguments seem to apply with even greater force to emerging markets and developing countries. Manufactures, modern services, and non-traditional agriculture are critically important for economic growth in these countries. Countries that have initiated and sustained modern economic growth have often done so on the back of successful expansion of exports. This has required the promotion of tradables through the adoption of supportive policies.

One economic rationale for emphasizing tradables is that the obstacles that impede structural transformation affect predominantly modern, high-productivity economic activities that are tradable.²⁷ Such obstacles can take the form of government failures, for example weaknesses in property rights and contract enforcement. Or they can come in the form of market failures, such as learning externalities or coordination failures. The first, best response is to eliminate these underlying distortions, but this is often easier said than done. Alternatively, second-best policies promoting tradables ensure that resources move from low to high-productivity activities, generating economic growth in the process.

This has been China's recent growth strategy, as well as that of Japan, South Korea, Taiwan, and other East Asian tigers before it. In contrast, countries experiencing shrinkage in non-traditional tradables, such as those in Latin America after 1990, have had low rates of economy-wide productivity growth. Even for emerging markets that have followed a less explicit export-led growth strategy than those in Asia, the trend toward sustained real exchange rate appreciation has rekindled old concerns about the Dutch disease consequences.

The structure of production depends on the relative profitability of different activities. The real exchange rate, as the relative price of tradables to non-tradables, may therefore shape structural

transformation and set the pace of economic growth. The question is how much weight central banks should attach to the impact of their policies on the real exchange rate.

In principle, they can take refuge in the dichotomy between nominal and real exchange rates and argue that the conduct of monetary policy has implications for the first but not the second. The real exchange rate is an endogenous relative price determined by real quantities, namely the balance between domestic saving and domestic investment. Under textbook conditions, the competitiveness of tradables can be divorced from monetary policy.

There are two counterarguments, one empirical and the other conceptual. The empirical point is that prices tend to be stickier than the exchange rate, as a result of which nominal and real exchange rates tend to move together. Exporters who see the value of the domestic currency rise can be pretty certain that this will have an adverse impact on their profitability over time horizons they care about.

The conceptual point is that economies with large amounts of surplus labour have quasi-Keynesian features, allowing monetary policy to have real effects. An excess supply of labour in rural areas (or informality) pins down the (nominal) wage rate at the margin at some low level. Since wages are a key determinant of non-tradable-goods prices, an increase in the nominal money supply can then raise the relative price of tradables to non-tradables (i.e., depreciate the real exchange rate) and have real effects. The Chinese economy provided a potential illustration until recently, when labour shortages began to produce wage increases.

Whether or not an undervalued real exchange rate is useful for promoting structural change in emerging market economies (a point about which there is no consensus among authors of this report), it has a major disadvantage. An undervalued currency taxes the consumption of tradables (along with subsidizing their production) and so produces a trade surplus. Other countries must, therefore, be willing to run the counterpart deficits on their trade account. Before the financial crisis, the United States and some other industrial countries were willing to do so. But as demonstrated by the debate over 'global imbalances,' the

effects may not have been entirely benign, and the advanced countries may no longer be happy to reassume their traditional role.

This also points to a distinction between small and large countries. A small country that seeks to maintain an undervalued exchange rate can do so without significant implications for global imbalances and the associated financial risks. Its policies will also have only minor implications for the competitiveness of its emerging market neighbours. For a large country, this kind of active use of exchange rate policy is more problematic on both grounds. This distinction also points to a potential fallacy of composition: what could work for an individual country may become problematic for the world when pursued by countries as a group.

One alternative to using monetary-cum-exchange-rate policy to promote growth-friendly structural change in the direction of producing exportables is of course to subsidize tradables directly or reduce input costs. Such policies can, in principle, be effective in promoting structural change, and if they are combined with macroeconomic policies that maintain external balance, they need not be associated with trade surpluses.²⁸ However, such policies run afoul of World Trade Organization (WTO) rules and the Agreement on Subsidies, in particular, which prevent emerging market economies from utilizing explicit or implicit export subsidies. Tax exemptions, directed credit, payroll subsidies, investment subsidies, domestic content requirements, and export processing zones are all potentially actionable under WTO rules.²⁹

Such policies also face well-known difficulties of implementation. Interventions may be poorly targeted and subject to political capture and rent-seeking. Currency policy, because it works across the board, is less prone to capture by specific industrial lobbies. For all these reasons, it is an inescapable reality that governments have tried to maintain an undervalued currency as a key element of their growth strategy.

The pressure on central banks to keep an eye on competitiveness can be intense. Inflation targeting that pays little attention to the level or volatility of the exchange rate becomes harder to practice.

Central banks are more likely to safeguard their independence by acknowledging such concerns and pressing for non-monetary policy measures that achieve similar aims than by playing the game 'who, me'? That means, in turn, greater cooperation and coordination with fiscal and regulatory authorities to create the conditions for a more competitive real exchange rate. Fiscal policy needs to be tight enough to allow the currency to settle on a lower trajectory. Regulators need to be willing to tighten prudential liquidity requirements and capital-account measures when too much money is flowing in. Central banks can signal their willingness to watch (if not 'target') the exchange rate, as long as other parts of the economic-policy machinery are doing their respective bits.

The point that not all countries can simultaneously run trade surpluses obviously still stands. From a systemic standpoint, while policies designed to prevent currency overvaluation are not objectionable, those targeting large undervaluations and trade surpluses certainly are. Similarly, there is an element of externality in capital controls in that one country's success in evading capital inflows only increases the difficulty of other countries doing the same. This is certainly a problem at the level of emerging markets as a group.

What Should Central Banks Do?

The chapter enumerates a number of additional pressures that central banks will face in the post-crisis economic environment. These will make it difficult for them to implement their policies using a traditional framework in which price stability is the overarching goal. Unavoidably, they will become entangled in debates over public debt and its management and come under pressure to do something to help maintain competitiveness in the production of tradables.

While the two sets of issues arise most immediately in different sets of economies, high public and private debts are mainly a problem for the advanced economies and though exchange rate overvaluation is largely a worry for emerging markets (although Japan and Switzerland are currently experiencing difficulties) they are related. While emerging markets may increasingly look to financial regulatory

measures to keep international capital 'out' during periods of surging capital inflows, advanced economies have incentives to keep capital 'in' and create a domestic captive audience to facilitate financing for the high existing levels of public debt.

Concerned about overheating, inflationary pressures, and competitiveness issues, emerging market economies may, in some cases, welcome changes in the regulatory landscape that keep financial flows bottled up in advanced economies rather than let them spill across borders. This creates the possibility that advanced and emerging market economies may at some point meet on the common ground of increased regulation and/or restrictions on international financial flows and, more broadly, on returning to a more tightly regulated domestic financial environment.

This much is positive analysis. This chapter now turns to the normative question of how central banks might handle these difficult burdens placed on them.

Firstly, central banks are more likely to safeguard their independence and credibility by acknowledging the tensions between inflation targeting and competing objectives than by denying such linkages and proceeding with business as usual. Central bank independence ultimately rests on political consensus; on the convergence of views among leading political interests that society's broader economic goals are best served by this independence. A central bank, perceived as insensitive to problems of debt sustainability and exchange rate overvaluation, is likely to be dragged into bruising political battles and will not be able to maintain its independence for long. This does not mean that central banks must become debt-managers' and development ministers' poodles, but neither can they aspire to the purity of driven snow.

Exceptional circumstances might require exceptional responses. In those circumstances, it is crucial that the central bank clearly communicate what it is doing and why and how its actions are consistent with its broader policy framework. While taking unconventional steps to support the market in sovereign bonds, central banks need to make clear the rationale for their action. If the justification is disorderly

conditions in the market due to temporary liquidity problems or panic, its purchases are likely to be temporary and should be explained as such. If the action is designed to help give the government extended breathing space so it can put in place a package of adjustment measures to revive the economy and grow out from under the debt burden, purchases may have to continue for a lengthier period, and again this should be explained.

An example of what not to do can be seen in the case of the European Central Bank, which resumed purchasing peripheral Euroarea bonds without adequately explaining why it was following this course of action. Not surprisingly, its initial action did not restore confidence.

On the exchange rate overvaluation front, central banks will have to devise a communication strategy that acknowledges the importance of the level and volatility of the exchange rate, without committing to use foreign exchange market intervention or capital controls as the primary instrument to maintain external competitiveness. This will allow them to take actions to prevent exchange rate overshooting in exceptional circumstances without departing from the inflation targeting framework.

Central banks should also make clear, however, that monetary policy is only one part of the policy response. Bond purchases without fiscal and structural adjustment achieve nothing. Maintaining a stable and fairly valued real exchange rate is not exclusively the responsibility of the central bank; achieving this goal and deriving benefits from it require also prudent fiscal policies, sound macro-prudential supervision, and, where necessary, regulation of the capital account. The message from central banks has to be that they are willing to keep an eye on the currency with the goal of preventing overvaluation as long as the fiscal and regulatory authorities are fulfilling their part of the bargain as well. Making the *quid pro quo* with the government explicit not only educates the public, it helps deflect pressure from the central bank.

Similarly, with regard to the challenges posed by debt overhangs, particularly those of the public sector, a communication strategy that addresses recurring concerns about the central bank's independence from the fiscal authorities will be crucial in maintaining

credibility. More transparency on the policy objectives and strategy are especially valuable in periods (such as that now being experienced by the Federal Reserve) when a very expansive policy stance is observationally equivalent to monetization of the debt. Complicating matters, the decision-making authority on financial regulation matters (as discussed above) is often split between the finance ministry and the central bank. It should be a priority to spell out the macro-prudential rationale and dimensions of any changes in financial regulation that facilitates government financing.

Rethinking Central Banking

There is an emerging consensus that the framework underpinning modern central banking must be rethought. A monetary policy framework focusing on price stability and output growth will also affect financial stability through its impact on asset valuations, commodity prices, credit, leverage, capital flows, and exchange rates. One country's monetary policy can spill over to other countries, especially when central banks follow inconsistent frameworks, with cross-border capital flows serving as the transmission channel. All this suggests that the conventional framework for central banking is inadequate. It is too narrow to meet domestic and global needs.

There may be broad consensus on this point, but there is still little agreement about the particulars of the new framework. It is those particulars that this section elaborates on.

Monetary Policy and Financial Stability

1. Financial stability should be an explicit mandate of central banks. Other micro and macro-prudential policies should be deployed first, wherever possible, in the pursuit of financial stability, but monetary policy should be regarded a legitimate part of the macro-prudential supervisors' toolkit.
2. When rapid credit growth or other indicators of financial excess accompany asset price increases, the authorities should employ stress tests to measure the effects of changes in credit conditions on asset prices, economic activity, and financial stability. Instead

of seeking to identify bubbles, the authorities should simply ask whether current financing conditions are raising the likelihood of sharp reversals in asset prices that are disruptive to economic activity.

3. Where the answer to the aforementioned question is yes, central bankers should then lean against the wind using a combination of the tools at their disposal, turning first to non-monetary micro- and macro-prudential tools, but also to monetary policy tools when necessary. If this results in periods when, in the interests of financial stability, the central bank sets policies that could result in deviations from its inflation target, then so be it.
4. Responsibility for the maintenance of financial stability can be assigned either to the central bank or to a self-standing financial supervisory authority. But in both setups, close coordination between the central bank and other agencies that contribute to ensuring the stability of financial conditions is essential. This is particularly important when policymakers have to evaluate the trade-offs between the use of monetary tools and prudential measures, and make decisions on the appropriate mix.
5. Central banks already require substantial operational independence in order to pursue their mandates. They will require even greater independence when a financial stability objective is added to those mandates. They will, in turn, have to establish the legitimacy of their actions in circumstances where the nature of threats to financial stability is poorly understood. The public and its elected representatives may not be happy, for example, if the central bank curbs credit growth in the interest of financial stability, causing asset prices to fall. This makes it important for the central bank to clearly communicate its assessment of the risks and the rationale for its policy actions. It needs to explain how it seeks to balance the objectives of price stability, output stability, and financial stability. Better communication and greater clarity on how the central bank will be held accountable for its broader mandate is necessary to defend central bank independence. Independence is politically viable only with accountability, and the best way to enhance

accountability is for central banks to become more transparent and forthright about their objectives and tactics.

6. The spillover effects of a central bank's policies in other countries are a legitimate concern. At present, central banks do little to internalize these effects. Admittedly, they may have difficulty in justifying actions taken in the effort to do so to domestic political authorities. This tension points to the need for further changes in prevailing policy framework. Specifically:
 - a. Domestic political authorities should be persuaded to allow such considerations to play an explicit role in the central bank's monetary policy framework in large economies.
 - b. Large-country central banks should pay more attention to their collective policy stance and its global implications. Where appropriate, they should consider coordinated action to help stabilize the global economy in times of stress.
 - c. These recommendations are unlikely to be implemented in isolation. It is, therefore, proposed that a small group of systemically significant central banks, perhaps called the International Monetary Policy Committee should meet regularly under the auspices of the Committee on the Global Financial System of the BIS. This group would discuss and assess the implications of their policies for global liquidity, leverage, and exposures, and the appropriateness of their joint money and credit policies from the point of view of global price, output, and financial stability.

Although central bank governors already meet regularly at the BIS, the authors recommend a substantial upgrade for the proposed committee from the current informal and closed-door format. Communication of central bank actions is important at the global level, just as it is for a domestic audience. In some ways, it is more important, since the global spillovers and coordination can be discussed explicitly. For this reason, the committee should periodically issue a report assessing and justifying their policies from this global perspective, pointing out areas of dissent or inconsistency. The report should be

submitted to the Group of Twenty and released more broadly with a formal public presentation.³⁰

Central bankers will of course insist they have no control over one another. Some will claim that such matters are already discussed informally at the BIS meetings or formally at the G20 meetings. However, the current BIS format is not conducive to accountability, and the current G20 format gives precedence to heads of government and finance ministers, not central bank governors. The discussion that takes place at the margins of the G20 meetings is informal. For these reasons, a separate forum is needed. The need to issue periodic public reports can help central bankers identify and publicly air the inconsistencies in their policies. With time, this should encourage them to internalize some of the external consequences of their policies.

This kind of report can inform a broader discussion on how the mandates of large central banks can be altered so as to minimize the adverse spillover effects of their policies, even while their responsibilities continue to be domestic. It would have the ancillary benefit of stimulating research on the definition, determinants, and means of control of global liquidity, a notion that nowadays remains a very abstract and ill-defined concept in policy discussions.

Macro-prudential Supervision under the Proposed Framework

Enhancing financial stability will require supplementing traditional micro-prudential measures with macro-prudential tools.

1. Regulatory guidance on LTV and DTI ratios over the cycle are useful tools for dampening credit booms. Countercyclical and contingent capital requirements, dynamic provisioning, liquidity buffers, and taxes on short-term funds borrowed by financial institutions are additional possible instruments. Given that there is still little evidence on the relative effectiveness and costs of each of these tools, authorities will have to learn by doing and from shared experience.
2. Supervisors will need to identify direct and indirect exposures and linkages, cross border as well as domestic. They need to identify institutions or trades where activity is disproportionately

concentrated (for example, on interbank derivative exposures). While they should collect such data for their own supervisory needs, they should also release that information, in aggregated form, to the broader public, including market participants. Broader dissemination will allow market participants to better manage risks and in turn allow the public to better monitor supervisory behaviour.

3. Cross-border surveillance of conditions pertinent to financial stability should be part of the mandate of the IMF, Financial Stability Board (FSB), and BIS. Such institutions should work in concert with domestic macro-prudential supervisory authorities to collect and disseminate information across countries on global exposures and risks, as well as experience with macro-prudential tools.
4. Macro-prudential tools will be more effective if coordinated and implemented across countries to dampen credit and leverage cycles. The IMF or a beefed up FSB/BIS should have the mandate to assess financial stability risks across borders and make recommendations to national supervisors on the level at which to set a relevant macro-prudential tool.
5. Some countries will benefit more than others from the use of macro-prudential tools and may also face lower costs of implementation. Coordination may be especially hard, however, when different countries see very different costs and benefits. This suggests that the multilateral institution responsible for assessing financial stability should:
 - a. Persuade all countries to put macro-prudential measures on the books, even if the measures are initially levied at zero rates.
 - b. Focus less on coordination at the initial stages, which will allow experience to be built up on the use of the tools in different settings.
 - c. Encourage supervisory authorities to expend greater effort to find tools that have lower costs relative to efficacy and therefore are more widely acceptable.

- d. Encourage greater dialogue as systemic risks build up so as to create the possibility of greater coordination.
6. The importance of cross-border spillovers associated with intermediation practices and conditions of systemically important financial institutions (SIFI) was highlighted by the recent crisis. Macro-prudential tools tailored to contain these risks include significantly higher capital buffers for SIFIs (the new Swiss regime proposes about 19 per cent), contingent capital requirements, and possibly a Financial Stability Contribution along the lines proposed by the IMF. While a start in implementing these measures should be made now, the precise form of such levies should be allowed to develop in light of experience. Unfortunately, because any such standard will be subject to extensive lobbying, the ideal requirement may be hard to attain, and the initial standards likely to be sticky. This suggests building flexibility into the initial standards, so there are alternative ways to meet the requirements.
7. Although there has been some progress on cross-border supervision (through the creation of colleges of supervisors, for example), there has been little progress on mechanisms for resolving failures of cross-border financial institutions. Efforts to harmonize national bankruptcy and resolution regimes should therefore be redoubled. Explicit loss-sharing protocols need to be negotiated, informed by the (soon-to-be-written) living wills of large cross-border banks.³¹ If no progress is made in addressing cross-border spillovers, countries will be inclined to protect themselves by mandating that foreign institutions place their domestic activities into separately incorporated and capitalized domestic subsidiaries, thereby partially reversing the globalization of finance. The committee recognizes this is a second-best option, and while it may be what the world will settle for, urges the regulatory community to be more ambitious.
8. Even vigorous countercyclical macro-prudential measures such as those recommended here cannot neutralize the effects of incompatible macro-economic policies. In a number of situations, macro-economic policies such as low interest rates on one side of

a border and exchange-rate targeting on the other can give rise to destabilizing cross-border capital flows. To the extent that these are problematic for financial stability, it is important for multilateral institutions to point to the incompatibility of macro-economic policies and press countries to make them more consistent instead of forcing countries to rely solely on macro-prudential measures.³²

9. More progress is needed on reducing the uncertainties surrounding the availability of liquidity facilities for dealing with systemic crises – such as bilateral swaps between central banks, regional liquidity pooling arrangements, and IMF facilities. While there may be an element of moral hazard associated with guaranteeing access to such facilities, financial stability may require such facilities to be ‘on the shelf’ – that is, to be ready for use if a crisis hits. At the very least, some efforts to aggregate the likely availability of such facilities and set them against potential needs should become part of the multilateral stability surveillance process.

Exchange Rates and Capital Controls

Many developing countries have found it helpful to intervene in the foreign exchange market as a way of encouraging exports and labour-intensive manufacturing. However, this practice can create problems for the global system when the country or countries concerned are large, either individually or collectively. This leads to the following recommendations:

1. Countries need to recognize that such policies are not without significant costs for their own economies and should move away from such policies over time. Even when such policies may be in their narrow short-term national self-interest, they should be encouraged by the international community to move away from them because of their implications for the global system.
2. This is not, however, an argument for an immediate transition to a freely floating exchange rate. Short-run interventions in the foreign exchange market that afford time to adjust may be justified. Occasional interventions that smooth out temporary exchange rate fluctuations that threaten serious dislocations may also be justified

when the temporary nature of the shock and the costs of sharp exchange rate changes are firmly established.

3. Controls on capital inflows whose main effect is to enhance financial stability, by preventing the build-up of currency or maturity mismatches or limiting the growth of intermediation through the domestic banking sector, have a useful role when other policy tools are not available or less than fully effective in addressing these problems. International standards should allow rare interventions in the foreign exchange market and temporary, financial stability-oriented capital controls while discouraging the use of measures that attempt permanently to distort the pattern of comparative advantage. In step with the reassessment of capital controls, blanket strictures against capital controls in bilateral investment treaties, European Union rules, and OECD guidelines need to be revisited.
4. Such measures will be more effective when applied uniformly to domestic and foreign institutions. Applying them differentially can give rise to opportunities for evading these measures through cross-bank transactions.
5. Policymakers should recognize the limitations, fiscal costs, and distortionary effects of instruments such as intervention in foreign exchange markets and even selective capital controls, especially when used for sustained periods. They should not see them as substitutes for structural reform and macro-economic policy adjustment.
6. When a number of countries undertake measures to intervene in foreign exchange markets, this should be taken as a signal to the proposed committee of central bankers that there are policy inconsistencies at the international level that need to be addressed. These discussions could improve the likelihood of collective solutions that minimize adverse spillovers, or at least reduce the possibility of tit-for-tat escalation – for instance, through trade restrictions or competitive devaluations – that leads to worse collective outcomes.

7. Cash-strapped governments will be tempted to use prudential measures to capture domestic sources of financing (via statutory liquidity requirements on banks mandating the holding of domestic government bonds, for example). Such practices are likely to become increasingly prevalent as governments grapple with the budgetary consequences of high post-financial-crisis debt ratios. This makes it important to recognize that these measures come with risks. They can lead to greater risk concentration (as, for example, when domestic banks become exposed to an insolvent government), something that could prove costly to the global community when the country needs foreign support. Moreover, long-term barriers to cross-border capital movements divert capital flows into less transparent channels, making it harder to undertake adequate supervision.

Conclusion

The objective in this chapter was to lay out a roadmap for central banking in the post-crisis world, where financial stability can no longer be seen as outside the direct ambit of monetary policy, cross-border spillovers have increased in scope and size, and central banks have come under new pressures. The chapter sets out a strategy for incorporating financial stability concerns in the implementation of monetary policy without diluting the price stability objective. It proposes institutional mechanisms for dealing with tensions caused by cross-border spillovers of inconsistent domestically oriented policies. Finally, it describes how central banks are under pressure from a variety of new mandates and constraints imposed on them by other policies and institutional structures and what they should do about it.

It is, of course, recognized that practical central banking differs from the theoretical ideal of flexible inflation-targeting and that it may already incorporate some of what is suggested. Still, a framework is needed to articulate and better guide central banking in the more complicated and interconnected world, especially in light of the lessons learned from the global financial crisis. By tracing the connections among different facets of central banking, the authors have attempted

to create a broader framework and set out some concrete proposals for making progress.

Endnotes

- ¹ This chapter was written by a broader group of authors who were part of the Committee on International Economic Policy and Reform. Other members of the committee are Mohamed El-Erian, Arminio Fraga, Takatoshi Ito, Jean Pisani-Ferry, Maria Ramos, Carmen Reinhart, H el ene Rey, Dani Rodrik, Kenneth Rogoff, Hyun Song Shin, Andr es Velasco, Beatrice Weder di Mauro, and Yongding Yu.
- ² Although neither the Fed nor the ECB had formally endorsed inflation targeting (IT), both were aiming at price stability, which made their policies largely similar to those of the central banks on a strict IT regime.
- ³ Looking ahead, some even regarded this regime as the solution to perennial international monetary controversies (Rose, 2007).
- ⁴ To what extent IT can be credited for the disinflation of the 1990s and the early 2000s is a matter for discussion. Another important factor was the disinflationary pressure coming from the emerging countries' exports. We return to the issue below.
- ⁵ Though the choice of regime itself may partly be a reaction to spillovers.
- ⁶ The early debate was framed by the stock market boom of the late 1990s. Arguments in favour of 'leaning against the wind' when it comes to financial developments have been given by Blanchard (2000), Bordo and Jeanne (2002), Borio and Lowe (2002), Borio and White (2003), Cecchetti, Genberg, Lipsky and Wadhvani (2000), Crockett (2003), Dudley (2006), and Goodhart (2000) among others. The argument against is given in Bean (2003), Bernanke and Gertler (1999, 2001), Bernanke (2002), Greenspan (2002), Kohn (2005), Mishkin (2008), and Stark (2008).
- ⁷ A policy school, primarily associated with economists from the Bank for International Settlements and the Bank of Japan, was critical of narrow inflation targeting and maintained that central banks could not forego their responsibility for financial stability. Bank of Japan economists regretted having allowed the bubble to become too large in the second half of the 1980s. The European Central Bank never fully endorsed the standard formulation of inflation targeting and argued that the growth of monetary aggregates and credit developments were also important indicators of potential risks to price stability over a longer-term horizon.
- ⁸ See Adrian and Shin (2011) for a discussion on these linkages.

- ⁹ Japan enacted an emergency resolution mechanism in 1998, following the banking crisis of 1997. When the emergency term ended, the government set up a permanent resolution mechanism.
- ¹⁰ Alternatively, at the regional level in places where multiple national economies share a single central bank (e.g., Euroland).
- ¹¹ See, for instance, the following editorial in the *Wall Street Journal*: ‘Capital-Control Comeback: As Money Flows to Asia, Politicians Play King Canute’ June 17, 2010. <http://online.wsj.com/article/SB10001424052748704289504575312080651478488.html>.
- ¹² For an extensive discussion, see Ostry, Ghosh, Habermeier, Chamon, Qureshi, and Reinhart (2010).
- ¹³ Figuratively, the attempt to clamber out of the ditch by buying dollars merely drags others into the ditch.
- ¹⁴ This combination of circumstances is not unusual – witness what happened during the recent financial crisis.
- ¹⁵ For an extensive discussion of these issues see Farhi, Gourinchas, and Rey (2011).
- ¹⁶ Lane and Milesi-Ferretti (2001) and Kubelec and Sá (2010) provide a quantitative account of financial integration and the participation in it of major emerging economies.
- ¹⁷ See Portes (2010) for a discussion.
- ¹⁸ That is the size of the current account surpluses in countries like China, Japan, Germany, Switzerland and the oil producers, matched (up to errors and omissions) by the corresponding deficits in US, UK, Spain, and elsewhere.
- ¹⁹ That factor alone suggests that fixed or semi-fixed exchange rate arrangements will be around for some time in emerging markets.
- ²⁰ Bank for International Settlements (2010).
- ²¹ See also Cetorelli and Goldberg (Forthcoming).
- ²² As indicated, for example, by the following excerpt from the speech by Fed chairman Ben Bernanke on November 19, 2010 at the ECB Central Banking Conference: ‘An important driver of the rapid capital inflows to some emerging markets is incomplete adjustment of exchange rates in those economies, which leads investors to anticipate additional returns arising from expected exchange rate appreciation’.
- ²³ See Reinhart and Reinhart (2010).

- ²⁴ See Figure 1.17 in that report. The question of course being the extent to which this reflects regulation, public pressure, or private incentives.
- ²⁵ See <http://www.lavanguardia.mobi/mobi/noticia/54140090670/El-Gobierno-limita-las-superofertas-de-depositos-bancarios-con-mas-exigencias.html>.
- ²⁶ Our discussion has focused primarily on Western Europe, but similar trends are emerging in Eastern Europe. Pension reform adopted by the Polish parliament in March of this year has met with criticism from employers' federations and business circles. According to the Polish Confederation of Private Employers Lewiatansay, the proposal seeks to hide part of the state's debt by grabbing the money of the insured and passing the buck to future governments. The confederation also points out that moving money from pension funds to ZUS will protect the government from having to change the definition of public debt and exceed financial safety thresholds, but will expose future retirees to losses. Struggling with budgetary pressure at home, Hungary has nationalized its pre-funded pension schemes and excluded the cost of the reforms from their public debt figures. Bulgaria has taken measures in the same direction.
- ²⁷ See Rodrik (2008).
- ²⁸ A production subsidy on tradables produces an incipient trade surplus, which can be eliminated by allowing the currency to appreciate. The appreciation does not remove the production stimulus on tradables entirely as long as tradables *consumption* is sensitive to the exchange rate. See Rodrik (2010).
- ²⁹ Least developed countries are exempt from these rules.
- ³⁰ Multilateral institutions like the IMF should also, of course, continue to analyse the spillover effects of large-country policies – as part of the Mutual Assessment Process (MAP), Article IV consultations, and the World Economic Outlook and Global Financial Stability Reports – and use these in evaluating a country's overall policy stance. The IMF's newly instituted 'spillover reports' are an obvious vehicle for carrying out this charge. The IMF should also analyse the collective policy stance of large central banks, and this report could be the starting point for the central bankers' discussions and report. The G20 needs to develop a mechanism for using these reports to influence domestic assessments of central bank performance.
- ³¹ A living will is a document prepared by the bank that explains to its supervisors where its assets and liabilities are, and how they will be sorted out in a bankruptcy.
- ³² For instance, this could be one of the tasks of the small committee of systemically significant central bankers proposed earlier.

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Sovereign Debt Overhang and Monetary Policy

Frank Smets and Mathias Trabandt

Introduction

The financial crisis that fully erupted following the failure of Lehman Brothers and the subsequent worldwide recession has triggered a rapid, large and at times coordinated response of monetary and fiscal authorities across the world. As a result, nominal short-term interest rates are close to the zero lower bound in the major industrial countries, central bank balance sheets have increased very significantly and government budget deficits and public debt have ballooned. On an average, public debt in the advanced economies is now reaching 100 per cent of GDP, levels that are unprecedented in peace time.² The rise in government debt raises concerns about the sustainability of public finances and the implications for the growth outlook. For example, Reinhart and Rogoff (2010) and Cecchetti *et al.* (2011a) have documented that historically public debt ratios of more than 80–90 per cent typically are associated with a long subsequent period of low growth. Taking into account the large and rising fiscal costs related to an ageing population, Cecchetti *et al.* (2010) conclude that the path pursued by fiscal authorities in a number of industrial countries is unsustainable. In a number of Euro area countries the rapidly growing government debt has led to rising interest rate spreads, setting in motion a self-fulfilling negative spiral whereby rising spreads increase

the interest rate burden, thereby reinforcing the increase in debt and justifying a further rise in spreads, in turn creating systemic risks in the Euro area as a whole. Against this background, the need for fiscal consolidation has quickly become one of the top priority policy challenges in many countries.

The rising government debt also complicates monetary policy. First, to the extent that the necessary fiscal consolidation programmes have a negative short-term impact on economic activity and constrain an active use of fiscal policy including the automatic stabilizers, it puts a larger burden on monetary policy to stabilize the economy.³ This may not be straightforward, if standard monetary policy is constrained by the zero lower bound on nominal short-term interest rates. In that case, non-conventional measures may have to be used, but their effectiveness is uncertain.

Second, to the extent that long-term government debt is issued in nominal terms it increases the pressure to reduce the real value of the debt by unexpected inflation. Inflation may also reduce the real burden of some of the nominal entitlement programmes.⁴ High government debt may also increase the pressure to rely on alternative sources of government finance such as seignorage. These pressures risk undermining the credibility and the independence of the central bank to maintain price stability and, may, thereby give rise to higher inflation expectations. The threat of fiscal dominance is rising. Finally, the increasing riskiness of government debt may undermine the proper functioning of financial markets and the transmission process of monetary policy. For example, by reducing the value and quantity of safe collateral it may increase the price of risk and liquidity premia. Moreover, to the extent that government interest rates set a floor for the cost of financing of private firms and households in the country it increases the cost of finance and complicates the transmission of monetary policy. Finally, a reduction in the value of government bonds will reduce the capital ratio of banks holding these government bonds and may thereby lead to a credit crunch as those banks try to adjust and deleverage.

This chapter reviews some of the issues related to the interaction between high government debt and monetary policy. In the next section there is a brief review, by way of background, the fiscal and monetary policy responses in the euro area, the United States and the United Kingdom. This section highlights that there are many similarities in the monetary and fiscal responses in those three areas, but also some differences. In all areas, policy-controlled interest rates were rapidly reduced towards close to the zero lower bound. However, the increase in the government deficit and debt as a percentage of GDP was larger in the US and the UK than in the Euro area, and in the former countries the increase in the size of the central bank balance sheet involved a larger share of purchases of government securities. This section briefly reviews the sovereign debt crisis in the euro area. Following the convergence of sovereign bond spreads in the first decade of European Monetary Union (EMU), spreads have widened dramatically in particular since the large upward revisions in Greek debt and deficit numbers at the end of 2009. A review of the empirical literature confirms that before 2007 sovereign bond spreads were only weakly related to fiscal fundamentals. In contrast, after 2008 both sovereign bond and CDS spreads became increasingly, and possibly excessively, sensitive to large changes in government debt. Evidence of contagion both among government bond markets in the euro area and between the sovereign and the banking sector, leading to a malfunctioning of the monetary policy transmission process in the euro area, led the European Central Bank (ECB) to establish its Securities Market Programme in May 2009.

Against this background, later on in the chapter there is a brief discussion on the effectiveness of conventional and non-conventional monetary policy measures in the presence of high government debt and in a situation where the zero-lower-bound on the short-term interest rate is binding. The chapter reviews the literature on forward guidance, in particular by Eggertson and Woodford (2003) and an extension by Smets and Trabandt (2012) using a Blanchard–Yaari overlapping generations model with sticky prices and risky government debt. It

also reviews some of the recent experience with forward guidance in Canada and the growing literature on the announcement effects of Large Scale Asset Purchases (LSAP) on bond yields.⁵ Overall, it is found that when the risk premium rises with increasing government debt, the burden on monetary policy to stabilize the economy increases. In the Smets-Trabandt model this takes two forms. Firstly, policy-controlled interest rates are stuck at the zero lower bound for longer. Secondly, the central bank purchases a larger amount of government debt.

The previous analysis is done under the assumption that monetary policy pursues an inflation objective under commitment and that the fiscal authorities adjust primary balances to target a certain debt level. In other words, in Leeper's (1991) terminology the economy is operating in an active monetary-passive fiscal policy regime. In reality, however, the fall out of the financial crisis has increased the probability of a switch to an active fiscal-passive monetary policy regime as interest rates are bound at zero and rising government debt has brought public finances closer to the fiscal limit, in particular if one also takes into account unfunded pension and other implicit liabilities. Next, there is a discussion on the inflationary risks of high government debt accumulation and central bank financing.

The risk-taking capacity of the central bank is limited by the need to maintain an inflation target and or the tax capacity of the government. Buitert (2007) and Durré and Pill (2011) emphasize that the central bank's exceptional creditworthiness ultimately depends on fiscal backing. When this fiscal backing is no longer sufficient, then also the central bank's credibility will be undermined. This may happen in two ways: either by increasing the inflation tax and allowing seignorage to be an alternative source of financing; or by undermining the credibility of stability-oriented monetary policy directly. The first case corresponds to the Sargent-Wallace framework of the so-called unpleasant monetarist arithmetic. In this case, an increase in government debt, if not fully backed by future real primary surpluses, will increase concerns about monetization of public debt, which will, in turn, raise inflation expectations and thereby increase long-term

interest rates. The second case corresponds to the Fiscal Theory of the Price Level (FTPL). In this case, an increase in government debt increases the wealth of bondholders while not reducing the wealth of others. The increase in debt thereby boosts aggregate demand and pushes up the price level. In this regime, the price level is the factor that equilibrates the nominal value of future discounted primary surplus and the nominal value of public debt. In both cases, rising inflation expectations and falling nominal bond prices would be the outcome.

In the second to last section, there is a brief and selective review of the theoretical literature, as well as the empirical evidence about the link between government debt and inflation. This review suggests that unsustainable government finance often is the source of episodes of very high inflation, which almost universally are associated with high money growth. However, it is more difficult to detect Granger causality from government debt to inflation in the advanced economies over the last three decades, possibly reflecting the more stable fiscal and monetary policy framework. This evidence together with the current stability of inflation expectations and high bond prices should, however, be of only limited comfort, as both theoretical and empirical evidence suggests that the regime may switch quite abruptly as the fiscal space shrinks.

The chapter ends by summarizing the findings and the resulting policy implications in the last section.

Background

This section briefly describes and compares the behaviour of growth, inflation, short-term interest rates, the size of the balance sheet of the central bank, the general government deficit and debt and the long-term government bond rate in the euro area, the United States, Japan and the United Kingdom during the financial crisis and its aftermath.

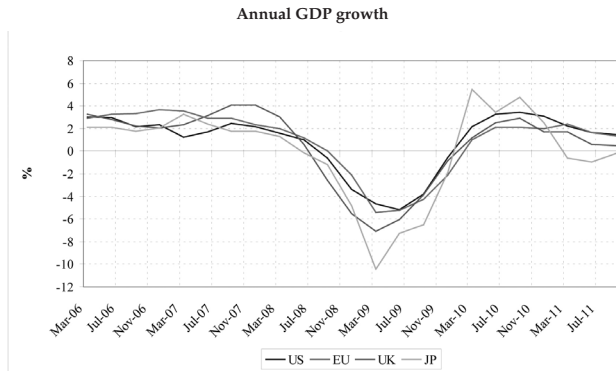


Figure 10.1: Annual GDP Growth Across Countries

Source: European Central Bank

Figure 10.1 shows how, following the failure of Lehman Brothers in September 2008 and the resulting collapse of the interbank market and rise in interest rate spreads, annual GDP growth collapsed with a trough of about minus 5 per cent in both the euro area and the United States, and a significantly larger drop in the United Kingdom and Japan. As a result of the worldwide fall in demand, oil and commodity prices fell from their peaks in 2008 and contributed to a quite rapid fall in consumer prices which reached negative annual rates in 2009 before bouncing back in 2010, as shown in Figure 10.2. One exception is the United Kingdom where annual inflation remained above 1 per cent partly due to a sharp depreciation of the pound sterling.

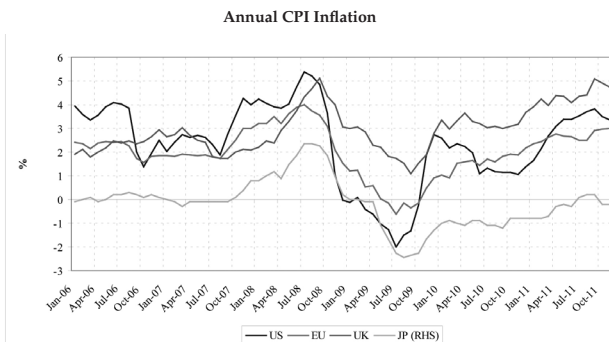


Figure 10.2: Annual CPI Inflation Across Countries

Source: European Central Bank

In response to the rapid fall in demand in the last quarter of 2008 and the beginning of 2009 and the risks of deflation, monetary and fiscal authorities in the major advanced economies eased policy rapidly and very significantly. On the monetary policy side, Figure 10.3 plots the short-term nominal interest rates in the euro area and the United States. Policy-controlled short-term interest rates were rapidly reduced to levels close to the zero lower bound. Moreover, various non conventional monetary policy measures, which aimed at avoiding that liquidity shortages in various financial markets (in particular in the money market) translated into an outright systemic collapse, resulted in sharp increase in the size of the balance sheet of the central bank (Figure 10.4) and a gradual reduction of money market spreads.

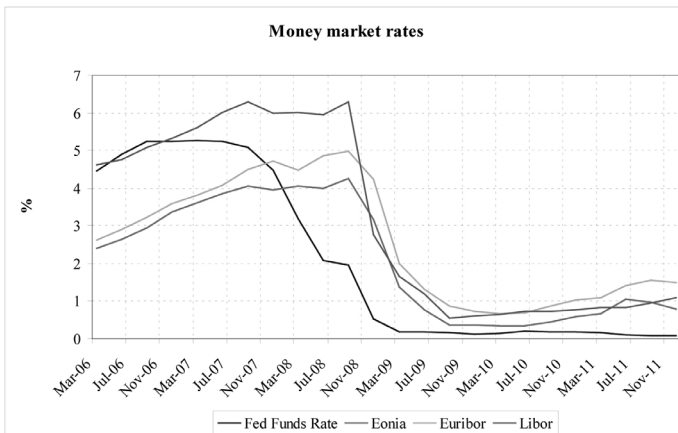


Figure 10.3: Money Market Rates across Countries

Source: European Central Bank

In the Euro area, the enhanced credit support implemented by the ECB in the course of 2009 consisted of (i) changing the provision of liquidity from variable-rate financing to full allotment at a fixed interest rate, (ii) broadening the collateral base which financial institutions could use to obtain central bank refinancing, (iii) lengthening the maturity of the refinancing operations, (iv) providing dollar refinancing through foreign exchange swaps; and (v) supporting the covered bond market which is an important source of long-term financing for financial institutions in the euro area through the Covered Bond

Purchases Programme (CBPP). In addition, as the sovereign debt crisis broke out in 2010, the Securities Market Programme (SMP) consisted of the purchase of selected government bond securities to alleviate malfunctioning in the government bond market and support the transmission of monetary policy throughout the euro area. Nevertheless, the share of purchases of government securities in the increase of the central bank's balance sheet is significantly larger in the United States and the United Kingdom due to the various Large-Scale Asset Purchases (LSAP) and Quantitative Easing (QE) programmes in those countries. As the sovereign debt crisis in the Euro area intensified in 2011, the expanded liquidity provision by the ECB including three-year long-term refinancing operations and a re-activation of the SMP led to an additional expansion of the ECB's balance sheet.

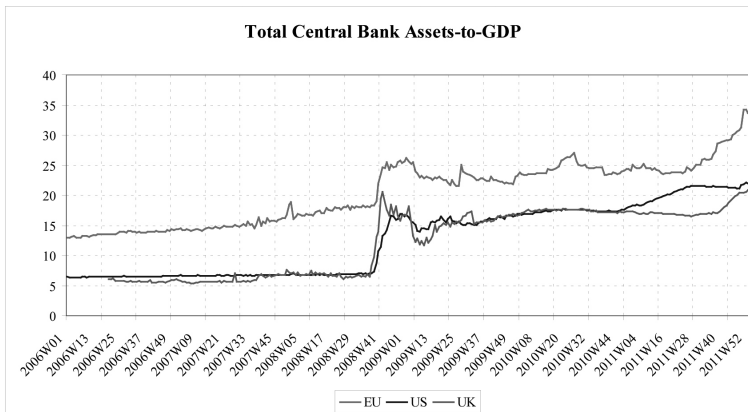


Figure 10.4: Total Central Bank Assets-to-GDP across Countries

Source: European Central Bank

On the fiscal policy side, the deterioration of the economic outlook, discretionary fiscal stimulus programmes and, to a lesser extent, support to the financial sector resulted in a sharp increase in the general government deficit and a rapid rise in public debt in all four countries. Figure 10.5 shows that both the total and the structural government deficit increased by less in the Euro area than in the United States, Japan and the United Kingdom. As a result, government debt rose more rapidly in the latter countries and surpassed the net debt to GDP

ratio in the Euro area in 2011. Nevertheless, long-term interest rates on government bonds fell to historic lows, partly driven by the historically low short-term interest rates and the large provision of central bank liquidity. The outbreak of the sovereign debt crisis in the Euro area in

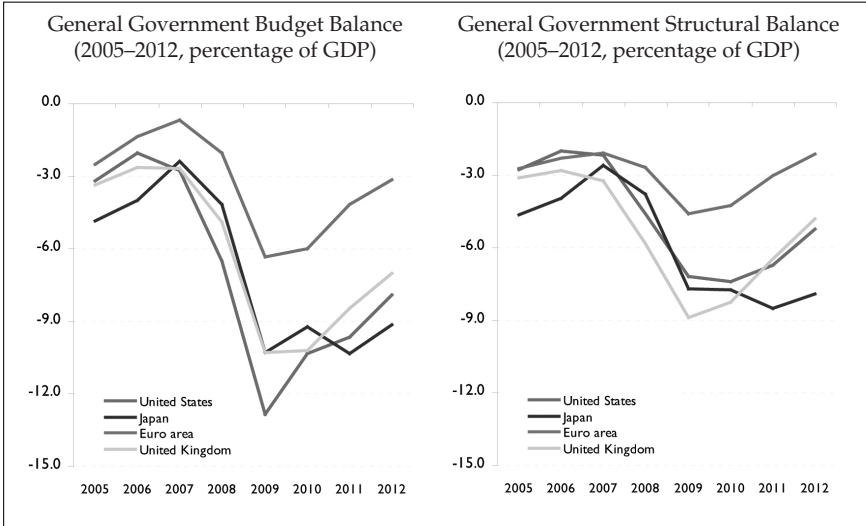


Figure 10.5: Government Balances across Countries

Source: IMF World Economic Outlook, September 2011.

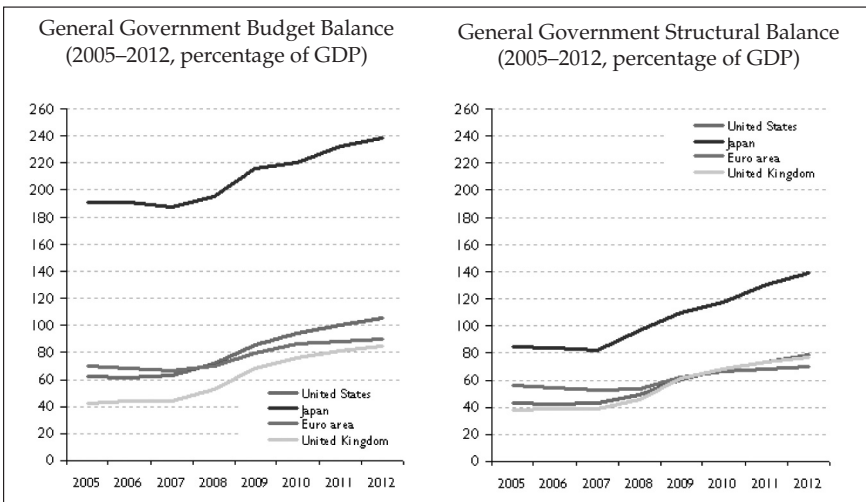


Figure 10.6: Government Debt across Countries

Source: IMF World Economic Outlook, September 2011.

2010 contributed to a rising gap between average bond yields in the Euro area and those in the United States, Japan and the United Kingdom. In line with the low nominal long-term interest rates, long-term inflation expectations have been stable throughout the crisis episode.

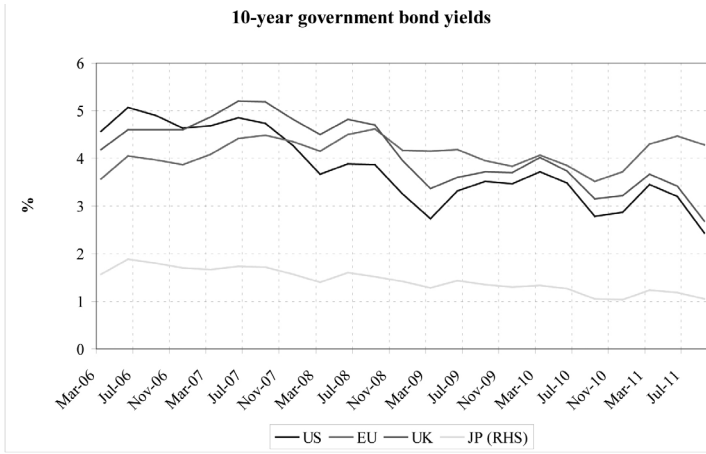


Figure 10.7: 10-year Government Bond Yields across Countries

Source: European Central Bank

Within the Euro area, fiscal developments have been quite diverse. Figures 10.8 and 10.9 illustrate the cross-country variation in debt and deficits. Following the convergence of sovereign bond spreads in the first decade of EMU, spreads have widened dramatically in particular since the large upward revisions in Greek debt and deficit numbers at the end of 2009 (Figure 10.10). A number of empirical papers [e.g. Arghyrou and Kontonikas (2011), Ejsing, Lemke and Margaritov (2011) and De Grauwe and Ji (2011)] have documented a regime change in the determinants of sovereign bond spreads before and after the financial crisis. Before 2007 sovereign bond spreads were only weakly related to fiscal fundamentals. In contrast, after 2008 both sovereign bond and CDS spreads became increasingly and possibly excessively, sensitive to large changes in government debt. Evidence of contagion both among government bond markets in the Euro area [De Santis (2011)] and between the sovereign and the banking sector [Corsetti *et al.* (2011)], leading to a malfunctioning of the monetary policy transmission process in the Euro area, led the ECB to establish its Securities Market Programme in May 2009. The SMP has helped

avoiding that the sovereign debt crisis turned into a full blast systemic financial crisis, but a durable solution must build upon four pillars: i) rebuilding the confidence in the sovereign by fiscal consolidation and the establishment of sufficient fiscal buffers; ii) the further integration of the banking sector in order to cut the close link between national banking sectors and government; iii) the establishment of a sufficiently large and flexible ESM to ring fence solvent governments and avoid contagion and iv) the strengthening of the surveillance of growing imbalances within the monetary union.

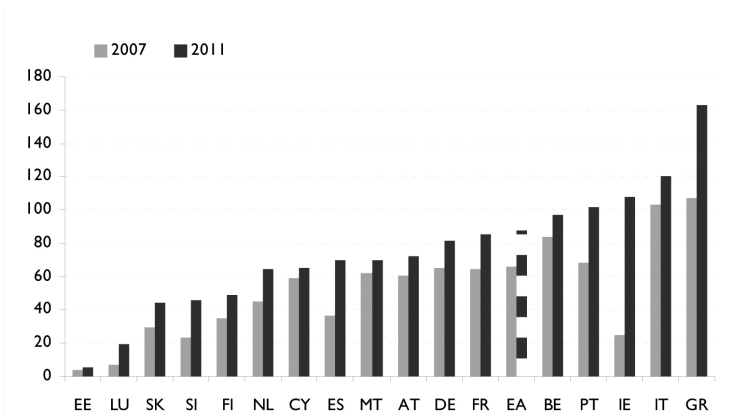


Figure 10.8: General Government Gross Debt in the Euro Area (% of GDP)

Source: European Central Bank

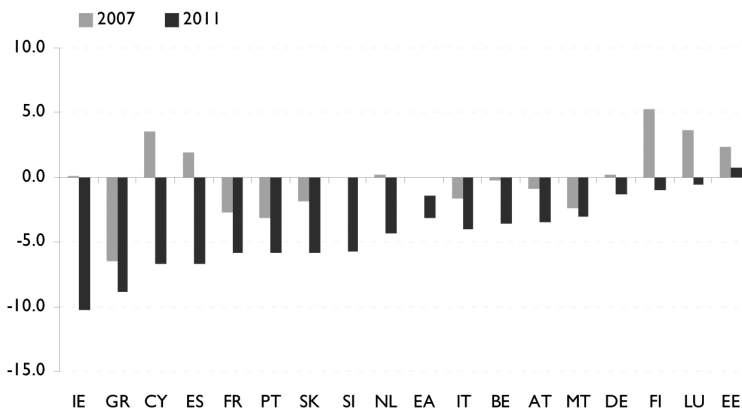


Figure 10.9: General Government Budget Deficit in the Euro Area (% of GDP)

Source: European Commission autumn 2011 economic forecast.

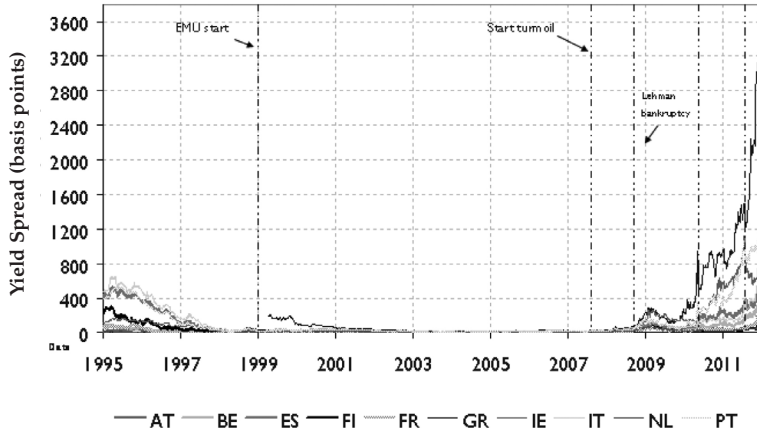


Figure 10.10: 10-year (Benchmark) Sovereign Bond Yield Spread Euro Area

Source: European Central Bank

Government Debt and Monetary Policy under the Zero Lower Bound

High government debt puts a larger burden on monetary policy to stabilize the economy, which may not be straightforward if standard monetary policy is constrained by the zero lower bound on nominal short-term interest rates. Eggertson and Woodford (2003) have studied the impact of the zero lower bound in the standard New Keynesian model.⁶ They argue that the key to dealing with the lower zero bound in the least damaging way is to create the right kind of expectations regarding how monetary policy will be used after the constraint is no longer binding, and the central bank again has room for manoeuvre. In the New Keynesian model a commitment to create subsequent inflation is able to raise inflation expectations, bring down long-term real interest rates and stabilize the economy. Such a policy, sometimes called 'forward guidance', involves a commitment to keep interest rates low for some time in the future. Eggertson and Woodford (2003) characterize optimal policy in the New Keynesian setting and show that it does indeed involve a commitment to history-dependent policy of a sort that should result in higher inflation expectations in response to a binding zero bound. They also show to what extent it is optimal to

create such expectations, and find, for example, that it is not optimal to commit to so much future inflation that the zero bound ceases to bind, even though this is one possible type of equilibrium. The zero bound does remain a relevant constraint, even under an optimal policy commitment, but such a policy can be very effective in preserving macroeconomic stability in the face of a contractionary demand shock.

Levin *et al.* (2010) challenge the latter conclusion. Although forward guidance is effective in offsetting natural rate shocks of moderate size and persistence, they find that the macro-economic outcomes are much less appealing for larger and more persistent shocks, especially when the interest elasticity parameter is set to values widely used in the literature. Thus, while forward guidance could be sufficient for mitigating the effects of a ‘Great Moderation’ style shock, a combination of forward guidance and other monetary policy measures — such as large-scale asset purchases — might well be called for in responding to a ‘Great Recession’ style shock.

Smets and Trabandt (2012) re-examine these results in a Blanchard–Yaari type macroeconomic model with sticky prices along the lines of Devereux (2011). In this model, every period new households are born with a fraction $1 - \delta$ of total population and die with a probability of $1 - \delta$. Because households have no bequest motive, the overlapping generation nature of the population structure implies that government bonds and money are net wealth: the usual Ricardian equivalence in dynamic models with infinitely lived households breaks down. A debt-financed increase in lump sum transfers to households will have a positive effect on spending because a part of the government debt will be paid back by future generations. This makes the model particularly suitable for studying the impact of government debt on the economy. This key difference between the basic New Keynesian model and the Blanchard–Yaari model is clear from the intertemporal consumption Euler equation:

$$\beta \frac{\sigma_t}{\sigma_{t-1}} c_t \frac{R_t^{Gov}}{\pi_{t+1}} = \frac{1-\delta}{\delta \mu_{t+1} \pi_{t+1}} \left[\frac{B_t^H}{P_t} + \frac{M_t}{P_t} \right] + c_{t+1} \quad (\text{Equation 10.1})$$

where c_t is consumption, σ_t is a shock to the household’s discount

rate, R_t^{Gov} is the interest rate on short-term government bonds, π_t is the inflation rate and the expression between square brackets is the real value of bonds and money held by the households. This Euler equation reverts to the standard New Keynesian forward-looking IS curve when $\delta = 1$. A few observations are worth making. When $\delta < 1$, the ratio of government debt and real money held by the households to GDP will have a positive impact on the steady state real interest rate. However, at the zero lower bound when money balances are satiated, a pure open market operation consisting of a swap of government bonds for money will have no impact on the economy as long as there are no risk premia associated with government debt. Similarly, bond and money holdings enter the dynamic Euler equation of the households and will have real effects on the savings decisions of the households.

In addition, Smets and Trabandt (2012) assume that households require a higher risk premium for holding government debt when the debt-to-GDP ratio rises above a certain target level.⁷ This raises the possibility that the central bank can partially stabilize the economy by lowering the risk premium on government debt. Corsetti *et al.* (2011) have investigated the effects of consolidation when sovereign spreads respond to the level of debt and have an effect on the private cost of financing. They find that such spread effects increase the probability of multiple equilibria, whereby an expected increase in spreads has a dampening effect on economic activity through a rise in the cost of financing, which in turn leads to a rise in deficits and debt justifying the initial rise. This is reminiscent of the dynamics of rising sovereign spreads, increasing costs of private financing, lower growth and weaker public finance that can be observed in some Euro area countries with high and rising government debt. They also find that depending on the level of debt the multiplier of a reduction in fiscal spending may be negative, as the consolidation reduces sovereign spreads and stimulates spending.

Using a calibrated version of the Blanchard–Yaari model, Smets and Trabandt (2012) simulate a great-recession type of shock and analyze the optimal monetary policy response when the central bank

cares about stabilizing inflation around an inflation objective and the output gap.

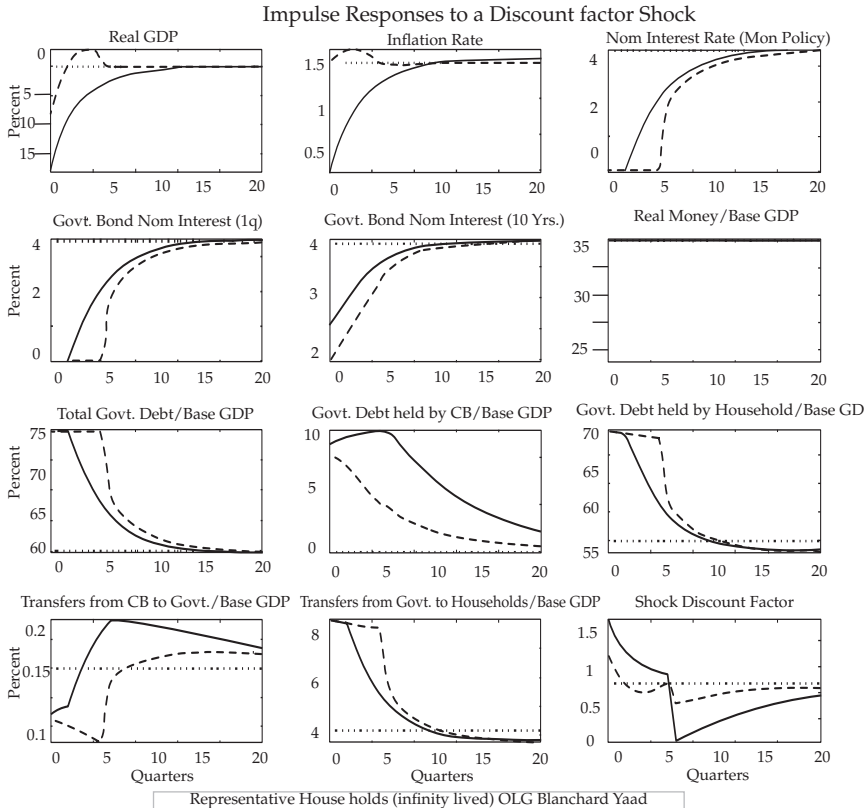


Figure 10.11: Responses to a Discount Factor Shock – OLG Model without Sovereign Risk Premium

Source: Smets and Trabandt (2012)

Figure 10.11 taken from Smets and Trabandt (2012) compares the economy's response to a persistent discount factor shock under optimal monetary policy and under a Taylor rule in the baseline version of the Smets–Trabandt model without a risk premium on government debt. Under the Taylor rule, real GDP drops by more than 3 per cent and inflation drops to 1.6 per cent. In response, the central bank lowers the interest rate to zero, where it stays for three quarters. The drop in interest rates leads to a rise in money demand which is accommodated by the central bank. The fall in output reduces labour tax revenues of

the government, raises the deficit and generates a rise in government debt. Under the optimal policy, the central bank keeps interest rates at zero for another three quarters. This manages to limit the recession to less than two per cent and leads to a small positive effect on inflation after about one quarter. Because of the smaller drop in output and the lower interest rate, government debt in this case actually starts falling. Thus, in the absence of a sovereign risk premium, the main results of Eggertson and Woodford about the positive effects of forward guidance in stabilizing the economy therefore continue to hold in this model with a non-trivial role for government.

Impulse Responses to a Transfers to Households Shock

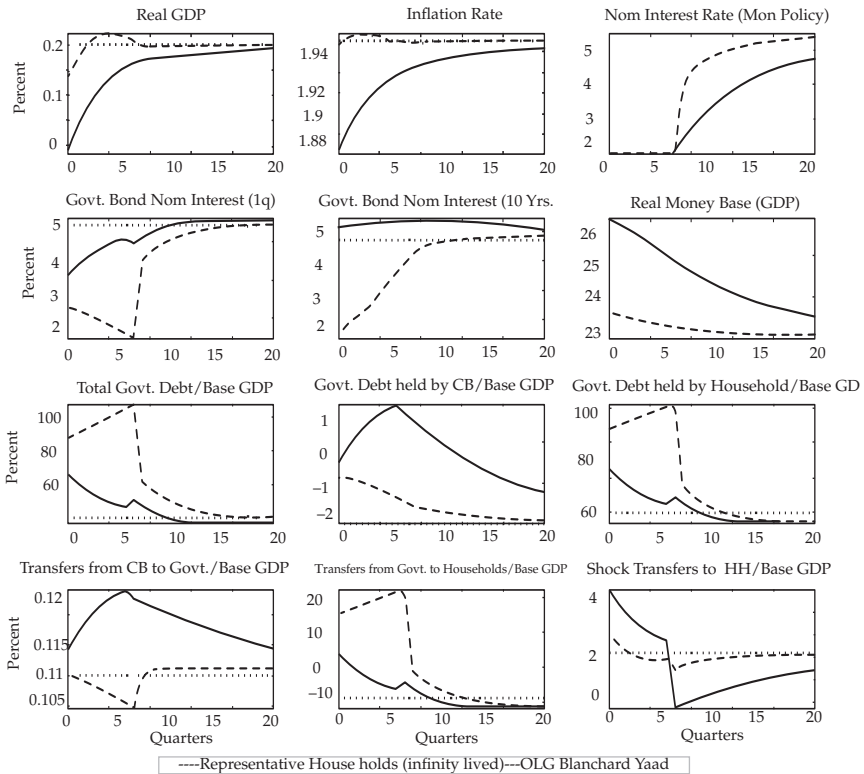


Figure 10.12: Responses to a Discount Factor Shock – OLG with Endogenous Sovereign Risk Premium

Notes: This figure is taken from Smets and Trabandt (2012).

Figure 10.12 (taken from Smets and Trabandt (2012)) shows a similar simulation in the model with a sovereign debt premium. First, consider the equilibrium when monetary policy follows a Taylor rule. With an initial debt-to-GDP ratio of 70 per cent, the shock leads to a much sharper fall in real GDP of about 8 per cent and a drop in inflation towards zero. As a result, the central bank lowers the short-term nominal interest rate to the zero lower bound, where it now stays for about 8 quarters. As before, the drop in interest rates leads to a rise in money demand which is accommodated by the central bank. The fall in output reduces labour tax revenues and increases government transfers. The government deficit rises and government debt now increases by about 20 percentage points of GDP compared to its initial value. Note that due to the increase of government debt and the presence of the endogenous sovereign risk premium, the interest rate on government debt rises relative to the policy rate controlled by the central bank which in turn has a dampening effect on money demand, increases government debt even more and reduces output relative to an equilibrium without endogenous sovereign risk premia. As a result, the central bank needs to keep its interest rate at the lower bound for much longer than without a sovereign risk premium.

Figure 10.12 also contains the allocations when the central bank pursues optimal monetary policy under the zero lower bound constraint. In this case, output and inflation again do not fall as much as under the Taylor rule, although more than in the case without a sovereign debt risk premium. In this case, it turns out to be optimal to reduce the implied risk premium on government bonds during the recession. This, in turn, triggers a substantial increase of real money balances, which the central bank accommodates by expanding its balance sheet and acquiring government debt in exchange for real money balances. Interestingly, the exit date from the zero lower bound is similar than the one under the Taylor rule equilibrium. The presence of the sovereign risk channel in the model appears to reduce the necessity for forward guidance as advocated by Eggertson and Woodford (2003)

substantially. If anything, even though the exit date of the optimal and the Taylor rule based policies are identical, optimal policy appears to return the nominal interest rate faster to the steady state.

Overall, a comparison of Figures 10.11 and 10.12 shows that the presence of risky government debt implies that the monetary policy needs to be more reactive. In order to limit the effect of the shock on the economy including inflation, the central bank needs to keep interest rates at zero for longer and to allow its balance sheet to increase substantially. Under commitment, these policies are quite effective. However, the effectiveness very much depends on the credibility of the central bank's commitment to generate inflation. Given that this promise is time inconsistent and in practice central banks seem to be reluctant to promise inflation above the target even if temporary, the effectiveness in reality may be more limited. The large purchases of government debt by the central bank needed to keep the spread on government bond rates low may also have negative side effects, if they undermine the incentive of the government to bring government debt back to its long-term target of 60 per cent and generate higher inflation expectations.

What does the recent experience inform about the effectiveness of forward guidance and non-conventional monetary policies, such as large-scale asset purchases? A number of inflation-targeting central banks, such as Sveriges Riksbank, the Bank of Norway and the Reserve Bank of New Zealand have continued to use interest rate projections to guide markets about the likely path of future policy-controlled interest rates. Moreover, since April 2012 the Federal Reserve Board provides an overview of Federal Open Market Committee (FOMC) participants' assessments of appropriate monetary policy and the appropriate timing of the policy firming. One particularly interesting experience is that of the Bank of Canada. On 21 April 2009, the Bank of Canada announced that 'Conditional on the outlook for inflation, the target overnight rate can be expected to remain at its current level until the end of the second quarter of 2010 in order to achieve the inflation

target.’ The explicit conditional policy statement tied to the inflation outlook lowered the short-term yield curve by about 15 basis points. Similarly, when the conditional statement was removed in April 2010, the short-term yield curve shifted upward by about the same amount. An econometric study by He (2011) also suggests that the slope of the yield curve was flatter following the initial announcement than one would have predicted on the basis of pre-crisis regularities. However, it is still questionable whether this policy is in line with the optimal prescriptions of Eggertson and Woodford (2003), as there was no explicit promise to keep interest rates low for longer to generate temporarily higher inflation than the inflation target.

There is also a growing literature on the effects of quantitative easing and LSAPs on bond yields and other asset prices. Kozicki *et al.* (2011) summarize the literature. They conclude that the evidence suggests that the implementation of unconventional monetary policy during the recent financial crisis, via credit easing and asset purchases, succeeded in reducing credit spreads and yields, thereby providing further easing of financial and monetary conditions and fostering aggregate demand. Most studies covered do find significant announcement effects of the Large-Scale-Asset-Purchases in the US, although the effects of the first round (QE1) seem to have been larger than those of the second one (QE2). This may be due to the fact that these policy measures are most effective when targeted to specific market failures, sufficiently large relative to the targeted market, and clearly communicated.⁸

Theory and Evidence on the Relationship between Government Debt and Inflation

Unpleasant Arithmetic and the Fiscal Theory of the Price Level

The analysis in the previous section assumed that the monetary/fiscal policy regime was characterized by an active monetary policy focused on maintaining price stability and a passive fiscal policy that adjusts the primary surplus in order to back up the value of debt, at least in the long run. The notion that central bank independence and credibility to achieve price stability depends on a credible debt-stability-oriented

fiscal policy has long been recognized. In the absence of such a stability-oriented fiscal policy, fiscal outcomes may determine inflation outcomes. This is sometimes called fiscal inflation as in Leeper and Walker (2011).

There are two basic approaches that may explain the link between unsustainable fiscal policy and inflation. The traditional and most well known argument relies on the Sargent–Wallace framework of the so-called unpleasant monetary arithmetic whereby an increase in government debt, if not fully backed by future real primary surplus, will increase concerns about monetization of public debt, which will, in turn, raise inflation expectations and, thereby, increase long-term interest rates. This will, in turn, reduce money demand and push up the price level even without a contemporaneous increase in money supply. In this case, seignorage is used as an alternative source of finance.^{9,10} However, seignorage is a relatively limited source of government revenue and is also subject to a Laffer curve which determines the maximum amount of revenues that the government can collect. As inflation rises, the demand for money (the tax base) will fall reducing overall seignorage income.¹¹

An alternative approach is the so-called Fiscal Theory of the Price Level (FTPL). In this regime, the price level is the factor that equilibrates the nominal value of future discounted primary surplus and the nominal value of public debt. Leeper and Walker (2011) recently summarized the research on the FTPL and clarified perceptions and misperceptions of fiscal inflation. Using a simple infinitely lived representative household model with a constant endowment and a government that issues nominal debt and raises lump sum taxes to finance transfers, they show that the household's intertemporal Euler equation, the government's budget constraint and the central bank's reaction function can be combined to yield the following equations:

$$\frac{\beta}{\alpha} E_t \left[\frac{P_t}{P_{t+1}} - \frac{1}{\bar{\pi}} \right] = \frac{P_{t-1}}{P_t} - \frac{1}{\bar{\pi}} \quad (\text{Equation 10.2})$$

where P_t is the price level, $\bar{\pi}$ the inflation objective, β is the discount factor, and α the central bank's reaction coefficient to inflation; and

$$E_{t-1} \left[\frac{B_t}{P_t} - \bar{b} \right] = E_{t-1} (z_t - \bar{z}) + (\beta^{-1} - \gamma) \left[\frac{B_{t-1}}{P_{t-1}} - \bar{b} \right] \quad (\text{Equation 10.3})$$

where B_t is nominal government debt, z_t are transfers to households, \bar{z} is the steady-state level of transfers, and γ is the reaction coefficient of lump sum taxes to the deviation of debt to the debt target, \bar{b} .

If the central bank follows a Taylor rule and responds aggressively to inflation ($\alpha > \beta$), the unique bounded solution of equation (1) for inflation is the inflation target. With monetary policy determining inflation, the expected evolution of real debt is given by equation (2). Because debt above target generates expectations of higher taxes or lower transfers in the passive fiscal policy regime, the debt is expected to return to steady state following a shock. Passive tax policy implies that fiscal adjustment must occur regardless of the reason why debt increases such as economic downturns or changes in household portfolio preferences, or central bank open-market operations. In the long-run, this is also the case in the Blanchard–Yaari model discussed in the previous section. Although there are periods of passive monetary policy (with interest rates at the zero lower bound) and active fiscal policy (with transfers not responding to debt) in the short run, ultimately both reaction functions need to kick in to ensure a unique equilibrium with the central bank determining the inflation objective.

In the regime with passive monetary policy (e.g. a constant interest rate set by the central bank) and active fiscal policy (e.g. a constant tax rate set by the fiscal authorities) on the other hand, the price level will be determined by fiscal policy. This can be seen from the expression of the value of government debt obtained by imposing equilibrium on the government's flow constraint, taking conditional expectations, and 'solving forward':

$$\frac{B_t}{P_t} = E_t \sum_{j=1}^{\infty} \beta^j (\tau_{t+j} - z_{t+j}) \quad (\text{Equation 10.4})$$

The real value of the nominal debt has to be equal to the expected future primary surpluses. Substituting the active fiscal policy (a

constant tax rate) into the forward-looking expression for debt and assuming that monetary policy sets the nominal interest rate on debt (\bar{R}), one can solve for the unique value of the price level:

$$P_t = \frac{\bar{R}B_{t-1}}{\left(\frac{1}{1-\beta}\right)\bar{\tau} - E_t \sum_{j=1}^{\infty} \beta^j z_{t+j}} \quad (\text{Equation 10.5})$$

In this environment changes in debt do not elicit any changes in expected taxes. As a result, at initial prices households feel wealthier and they try to shift their consumption patterns. Higher demand for goods drives up the price level and continues to do so until the wealth effect dissipates and households are content with their initial consumption plan. In this regime, the impact of monetary policy changes dramatically. When the central bank chooses a higher interest rate, the effect is to raise inflation in the next period. The higher interest rate payments increase income, consumption, and the price level. As discussed in Leeper and Walker (2011), more realistic adjustment patterns may take place if government debt is long term. In that case, the maturity composition of existing government debt may determine the pattern of inflation following a fiscal shock. However, also in this case the value of the long-term government bond will necessarily go down. Interestingly, Cochrane (2011) shows that in such a case, buying long-term debt for short-term debt will increase inflation now relative to later.

As discussed earlier in the chapter, currently the prices of long-term bond yields in the advanced economies like the United States, the United Kingdom and Germany are still very low and medium to long-term inflation expectations are stable. This raises the question under what circumstances fiscal policy may undermine monetary control of inflation. A negative shock to government revenues due to a recession like discussed in the previous section may undermine the soundness of fiscal policy, may lead to a higher fiscal deficit and an unsustainable accumulation of government debt, while at the same reducing short-term nominal interest rates to zero. The lower bound on interest rates will in that case imply a passive monetary policy, while the accumulation

of government debt may become unsustainable as the fiscal limit is reached.¹² If such a situation leads to a perceived probability of a switch to an active fiscal policy/passive monetary policy regime, this by itself will have an impact on inflation and inflation expectations. Leeper and Walker (2011) show that in this case, the economy will not exhibit Ricardian equivalence, but the quantitative effects will depend on how large the shock to public finances and the fiscal space is. In such a situation, higher expected deficits may start reducing the value of debt because they reduce the backing and therefore the value of government liabilities and monetary policy may lose control of inflation. The current relatively benign long-term interest rates in the largest advanced economies may not be of much comfort to the extent that the switch to an active fiscal/passive monetary policy regime may occur quite abruptly as shown in Bi, Leeper, and Leith (2011).

Evidence on the Link between Public Debt and Inflation

The theoretical possibility of a link between public debt and inflation is clear. What is the historical evidence of such a link? A commonly held view about the origins of inflation and excessive money growth is that it results from fiscal imbalances. This section reviews two cross-country papers that have investigated this link and present some suggestive evidence.

In their study of historical episodes of high inflation (greater than 100 per cent), Fischer, Sahay and Végh (2002) find that on an average a 10 percentage point reduction in the fiscal balance is associated with a 1.5 percentage increase in seignorage revenues (as per cent of GDP). This relationship is, however, much stronger for high-inflation countries, where a 10 percentage point reduction is associated with a 6.5 percentage increase in seignorage. In those countries, a reduction in the fiscal balance by 1 per cent of GDP leads to an increase in the inflation rate by 4.2 per cent, but no obvious long or short-run relationship between inflation and fiscal balance is found for the low-inflation countries.

A recent study that directly addresses the link between public debt

and inflation in a sample of 71 advanced and developing countries over the period 1963–2004 is Kwon, McFarlane, and Robinson (2009). Their regression results show a strong and stable positive effect of debt growth on inflation in developing and non-major advanced economies. The coefficient for public debt is nearly 0.2 for the short term and 0.25 for the long term, which implies that a 1 per cent increase in public debt leads to a 0.2 percentage point increase in inflation. The short and long-term coefficients are lower than those of money growth, but are significant at the 5 per cent level and rise to 0.3 and 0.5, respectively, for a subset of 25 indebted developing countries. The existence of the strong debt-inflation linkage, after controlling for money growth, suggests that the link between public debt and inflation may go beyond the transmission through money growth. By contrast, in 13 major advanced economies, none of the explanatory variables, except lagged inflation, show significant short-term associations with inflation. This finding is somewhat dependent on the empirical methodology used. For example, using mean group estimators, they do find evidence of an effect of the growth in public debt on inflation also in advanced economies, but the effect is again much stronger in less-developed countries with high foreign indebtedness. This evidence shows that the policy regime is of great importance.

In the rest of this section there is some suggestive evidence about the bilateral relationship between public debt and inflation using a database collected by Fratzscher, Mehl and Vansteenkiste (2011), who focus on the link between public debt and currency crashes. The database covers seventeen advanced countries, six of which contain data starting in the 1910s and eleven of which typically start in the 1950s.¹³ Broadly speaking there have been two waves of big increases in public debt in those countries before the current rise in debt. The first big wave is mostly due to the Second World War. The second wave occurred in response to the oil price crises in the 1970s and the

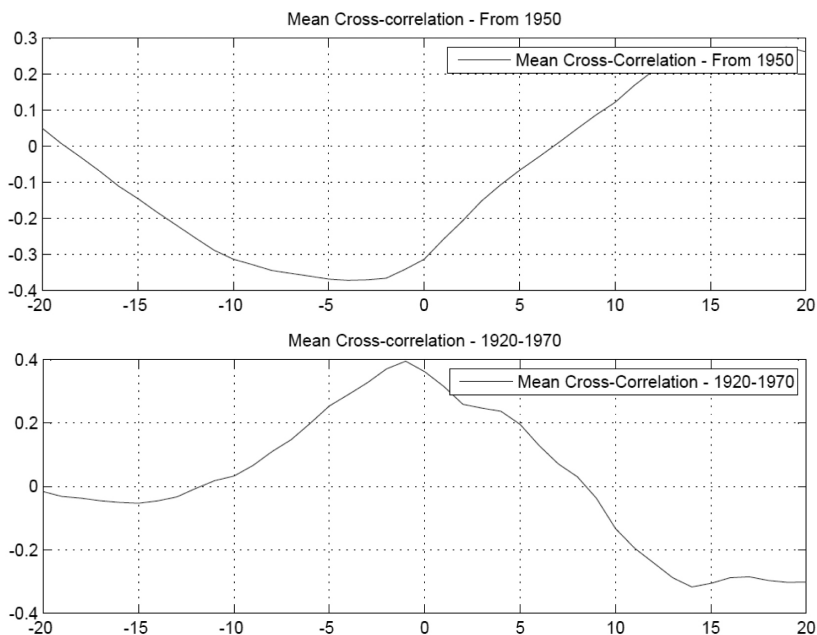


Figure 10.13: Cross-correlation between Debt-to-GDP($t-k$) and Inflation(t)

Source: Dataset from Fratzscher, Mehl and Vansteenkiste (2011); Annual data: the sample in the upper panel contains 15 advanced economies; the sample in the lower panel contains six advanced economies. Mean group estimates.

productivity slowdown.

Figure 10.13 plots the cross correlation between public debt and inflation in two partly overlapping samples covering the two waves. The first sample is from 1910 to 1970 and covers six advanced countries. The second sample is from 1950 to 2009 and covers 15 advanced countries. The charts show that there is a positive correlation between current and lagged public debt and inflation in the earlier sample period, suggesting that following the build-up of nominal debt during the Second World War, inflation was one way of reducing the nominal debt. This is consistent with the discussion in Aizenham and Marion (2010) for the United States and also complementary to the findings in Reinhart and Sbrancia (2011). The latter finds that financial repression (*i.e.*, negative real interest rates) has been one common way in which public debt has been dealt with in the past. In contrast, in the

post Second World War sample, there is a negative correlation between current and lagged debt and inflation. These results are confirmed by the impulse responses from a simple bilateral vector auto-regression of

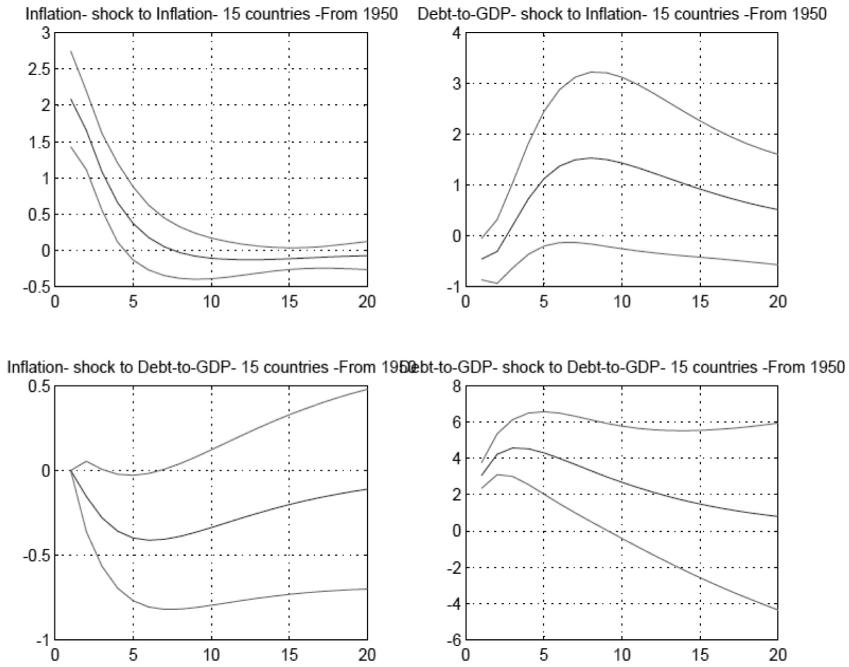
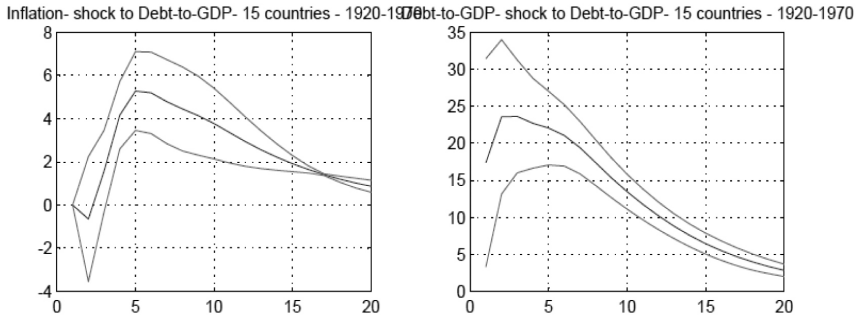


Figure 10.14: Impulse Response to an Inflation and Debt-to-GDP Shock 1950s-2009-15 Countries

Source: Dataset from Fratzscher, Mehl and Vansteenkiste (2011); annual bilateral VAR(2) in inflation and debt-to-GDP ratio. Choleski decomposition with debt-to-GDP ordered last. Mean group estimates.





order 2 in Figures 10.14 and 10.15.

Figure 10.15: Impulse Response to an Inflation and Debt-to-GDP Shock 1920-1970–5 Countries

Source: Dataset from Fratzscher, Mehl and Vansteenkiste (2011); annual bilateral VAR(2) in inflation and debt-to-GDP ratio. Choleski decomposition with debt-to-GDP ordered last. Mean group estimates.

Without a structural model, it is difficult to interpret these reduced-form findings. However, both the cross-country differences and the differences over time suggest that the institutional framework and the credibility of the policy regime are important in explaining the presence or absence of such a link. In particular, in the past advanced economies may have had a greater capacity to adjust taxes and spending to contain and reduce increases in public debt. Secondly, the monetary policy frameworks established in the 1980s in response to the great inflation experience may have contributed to a stabilization of inflation and inflation expectations. Indeed, Leeper, Chung and Davig (2007) find that most of the post-1980s period is characterized by active monetary policy.

Conclusions

As a result of the financial crisis and the subsequent recession, government debt has significantly increased in many advanced economies. High and rising government debt complicates monetary policy. On one hand, it increases the burden on monetary policy to stabilize the economy. When conventional monetary policy is

constrained by the zero lower bound on nominal short-term interest rates, this can be done by keeping interest rates at the lower bound for longer and/or by applying non conventional policy measures such as large-scale asset purchases or quantitative easing. On the other hand, high nominal government debt may undermine the effectiveness of such policy measures. First, it may raise the pressure to inflate, undermine the credibility and independence of the central bank and thereby destabilize inflation expectations. Second, by increasing the perceived riskiness of government debt, high government debt may also undermine the proper functioning of financial markets and the transmission process of monetary policy, as has been evident in parts of the euro area. In both cases, a situation of fiscal dominance may arise, whereby monetary policy loses control over price stability. Ultimately, this can only be prevented if fiscal consolidation re-establishes the credibility of public finances and the sustainability of the government debt.

Endnotes

- ¹ The views expressed are our own and should not be attributed to the European Central Bank, the Board of Governors of the Federal Reserve System or any other person associated with the Eurosystem or the Federal Reserve System. We thank Giovanni Nicolo for excellent research assistance. This chapter has been prepared for the Second International Research Conference of the Reserve Bank of India on Monetary Policy, Sovereign Debt and Financial Stability: The New Trilemma. Contacts: Smets: European Central Bank, Directorate General Research, Kaiserstrasse 29, 60311 Frankfurt am Main, Germany, and KU Leuven, Belgium, e-mail: frank.smets@ecb.europa.eu. Trabandt: Board of Governors of the Federal Reserve System, Division of International Finance, Trade and Financial Studies Section, 20th Street and Constitution Avenue N.W, Washington, DC 20551, USA, e-mail: mathias.trabandt@gmail.com.
- 2 See IMF (2011).
- 3 There is a debate about the extent to which and under what conditions fiscal consolidation can have non-Keynesian positive effects. See, for example, Alesina and Ardagna (2010). The consensus is, however, that in most cases one needs to go through some short-term pain to have a long-term gain. See, for example, Clinton *et al.* (2010) and IMF (2010).

- 4 See, for example, Persson *et al.* (1996).
- 5 For a recent overview see, for example, Kozicki (2011).
- 6 See also Adam and Billi (2004) and Nakov (2008).
- 7 Smets and Trabandt (2012) do not address the optimal level of debt. Recently, Leith *et al.* (2011) analyze the optimal level of public debt in a Blanchard-Yaari model. Another interesting recent paper is Adam (2011) who analyses the implications of nominal government debt for the optimal response to productivity shocks. In his framework, higher government debt requires lowering the average level of public spending and exposes fiscal budgets to increased risks following technology shocks or – more generally – fluctuations in the tax base. These budget risk considerations can provide quantitatively important incentives to reduce government debt over time. The results in this chapter suggest that debt optimally converges to zero over time and that the optimal speed of debt reduction tends to increase if governments cannot adjust their spending plans following fluctuations in the tax base.
- 8 See also Joyce *et al.* (2011) for evidence on the effects of Quantitative Easing in the United Kingdom.
- 9 Of course, as long as the transfer of seignorage is compatible with the inflation objective, as for example is the case in the model of the previous section, this should not necessarily lead to inflation expectations.
- 10 This will be independent of the effects of devaluing the nominal debt and will also be a source of revenue even if the public debt is in real terms.
- 11 See Buiter (2007) for an extensive discussion on seignorage and the interaction between the central bank's and governments budget constraints.
- 12 Trabandt and Uhlig (2011, 2012). discuss fiscal limits in the US and across countries in Europe on the basis of Laffer curves.
- 13 The first sample includes six countries: Finland, Italy, Netherlands, Sweden, Switzerland, and the United States. The second sample includes fifteen countries: Australia, Belgium, Canada, Denmark, Finland, France, Germany, Japan, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom, and the United States.

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