Macroprudentialism

Edited by Dirk Schoenmaker

CEPR Press

Duisenberg school of finance

A VoxEU.org Book

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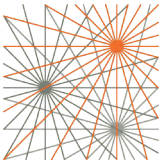

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Foreword

Macroeconomics has a new toolkit – macroprudentialism. The Global and Eurozone Crises have made clear that bubbles in the financial sector can trigger vicious feedback loops where unravelling risk damages the economy in ways that accelerate the unravelling and magnify the damage. Central banks must therefore keep an eye on both goods and asset price inflation.

As Tinbergen taught us decades ago, government central banks can't track two goals with a single tool. This is why central banks tasked with maintaining both price and financial stability are now turning to macroprudentialism.

But we are still relatively unfamiliar with the macroprudential framework's objectives and their interactions with monetary policy.

This eBook aims to lay the basis of cohesive debate, rather than make blanket policy judgements. The authors – leading economists from a broad range of perspectives – discuss the 'two pillars' of macroprudentialism and the implications of interactions with other policies. There are several clear points of agreement. It is clear that macroprudential policy in any form needs absolute freedom from short-term political pressures. It is the very reason why such policy can only be in the hands of independent agencies like central banks or supervisory authorities. But such responsibility in turn requires sufficient democratic accountability, as macroprudential policy is certain to have significant impact on citizens. While the authors all agree on the basic objectives of macroprudentialism, they identify many points of disagreement where more research is needed to clarify judgements.

Under Dirk Schoenmaker's excellent editorship, the best thinking from across the US and the EU on this issue is brought together. Over the fourteen chapters, the reader goes from a comprehensive understanding of the theory to considering questions of political accountability and feasibility within the macroprudential framework.

As usual, our thanks go to Anil Shamdasani and Shreya Sinha for excellent and efficient handling of the eBook's production. CEPR, which takes no institutional positions on economic policy matters, is delighted to provide a platform for an exchange of views on this critical topic.

Tessa Ogden
December 2014

Introduction

Dirk Schoenmaker
VU University Amsterdam and Duisenberg School of Finance

Macroprudentialism has moved to the centre of the policy agenda as a result of the Global Financial Crisis. This introductory chapter of a new VoxEU eBook draws attention to the objectives of macroprudential frameworks, their interactions with other policies, and discusses the need for European coordination. Macroprudentialism is expanding beyond its original narrow focus on banking, to securities, insurance and pensions. Using insight from the various contributions to the eBook, the author concludes that macroprudential policies, much like monetary policies, is more art than science. The consequences would depend on the specifics of a country's financial system, and some consequences may be unintended.

Macroprudential supervision is the missing link in the broader monetary and financial policy framework – as the Global Crisis and subsequent Eurozone Crisis painfully pointed out. In several nations including the US, Ireland and Spain, spectacular rises in house prices were accompanied by unsustainable credit growth. The bursting of the US bubble was not a microprudential, 'bad loan' event – it triggered the largest crisis the world has seen since the Great Depression. Bursting of the Irish and Spanish bubbles threatened national solvency – not just bank solvency.

Central Bankers and other macroeconomic policy makers stood by and watched the problems accumulating since they thought it was sufficient to conduct monetary policy and microprudential supervision. But the former is only concerned with the inflation of consumer goods, ignoring inflated asset prices. And the latter is only concerned with the soundness of individual financial institutions, using internal models that are run on the assumption that risk is exogenous.

The Global and Eurozone Crises have shown that the financial system as a whole matters and that the unravelling of risk has endogenous feedback loops, as the chapters by Claudio Borio and Anil Kashyap and co-authors point out.

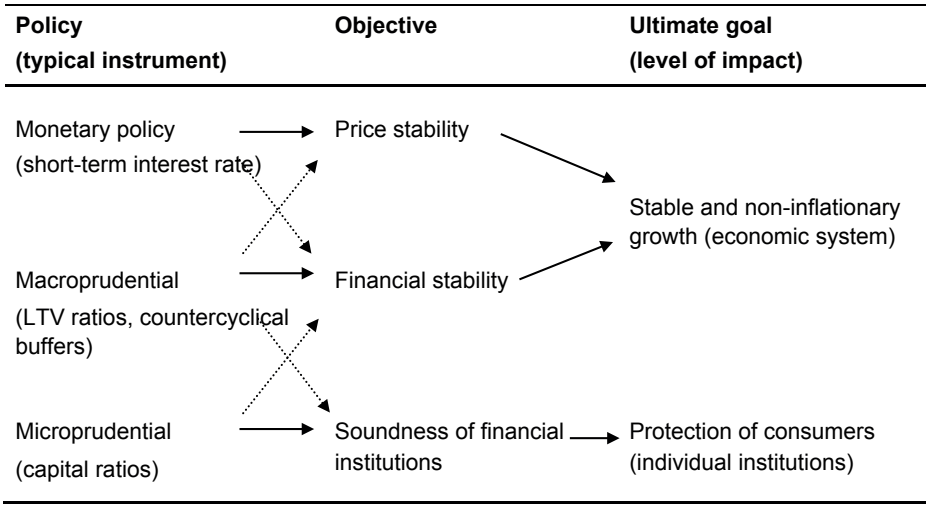
New policy framework

Figure 1 shows the new policy framework and places macroprudential supervision in the middle of monetary policy and microprudential supervision. Macroprudentialism has moved to the centre of the policy agenda (Baker 2013) and has interactions with both policy areas as the authors of the eBook point out.

Macroprudential supervision operates at the level of the financial system and is concerned with the impact on the wider economy. Asia has learned its lesson after its own crisis in the late 1990s, and has introduced macroprudential policies earlier. Hong Kong, for example, has adopted an aggressive loan-to-value policy, under which the Hong Kong Monetary Authority reduces the ratio for new mortgages when house prices are rising too fast.

Central banks are returning to their roots by re-assuming a broad mandate. History teaches us that central banks have always had a dual role: maintaining price stability and financial stability, as Charles Goodhart points out in his chapter. Accordingly, financial stability departments of central banks have been and continue to be strengthened. Moreover, new structures are being put in place to facilitate proper coordination between the major players: finance ministries, central banks, and financial supervisors (for details, see ASC 2014). At the global level, the Financial Stability Board provides coordination between the authorities of the major countries.

Figure 1 Policy framework for the financial and economic system



Source: Schoenmaker and Wierts (2011).

What are the objectives?

There is consensus on the broad objectives of macroprudential supervision. With respect to the time dimension, macroprudentialism should increase the resilience of the financial system against financial shocks. With respect to the cross-sectional dimension, macroprudentialism aims to strengthen the structure of the financial system. But then the disagreement sets in.

Some analysts would be modest and aim just to increase the resilience of the financial system against financial shocks (the Borio chapter makes the case for this). Others would go further, preferring countercyclical policies to constrain financial booms, which are largely related to housing and property markets (as argued by Gersbach and Rochet and by Claessens, Kose and Terrones).

My take is that macroprudential supervision should – at the minimum – reduce the contribution of the financial system to the swings in the financial cycle, i.e. reining in the growth of credit and asset prices. This is exactly what Gersbach and Rochet

propose as the objective: to limit the banking system's tendency to amplify economic fluctuations.

Next, the macroprudential focus should be on the financial system rather than on individual financial institutions. Kashyap and co-authors stress that macroprudential policies should acknowledge the different functions of the banking system: 1) sharing risks for business and households; 2) monitoring loans; and 3) creating liquid claims (deposits) to facilitate transactions. In addition to the banking system, Tucker advises policymakers to look additionally at the shadow banking sector and securities markets. Dirks, De Vries and Van der Lecq stress the impact of financial institutions with a large asset base - such as pension funds and insurance companies - on the macroeconomy. Poorly designed micro-supervisory rules for these financial institutions may amplify the business cycle. The authors call for a macro makeover of these micro rules.

Interaction with other policies

The authors of the eBook reflect both sides of the longstanding debate on how monetary and macroprudential policies should interact. Goodhart and Tucker stress the role of macroprudential policy as being separate from that of monetary policy. Macroprudential policy takes a more granular approach by targeting particular markets or sectors, such as housing and property markets. In contrast, Borio argues that monetary and macroprudential policies work in tandem since monetary policy influences risk perceptions and risk appetite (the risk-taking channel). Next, as Stein (2013) puts it, monetary policy is more persuasive because it "gets in all the cracks" of the financial system. Finally, Portes takes the middle ground by arguing that sometimes a compromise may need to be struck between monetary and macroprudential policy.

Next, there is the issue of how to strike the right balance between macroprudentialism and microprudentialism. There is an emerging consensus that macro stability should have priority over micro soundness (see the chapters by Tucker and by Dirks and co-authors; and ASC 2014). In a more reflective mode, Borio argues that macroprudentialism

stands for an intellectual orientation or lens through which the task of achieving financial stability is understood. Prudential tools should be designed through a macro lens instead of the prevailing micro lens.

Two pillars of the macroprudential building

The macroprudential 'building' has two pillars or risk dimensions (Schoenmaker and Wierts 2011):

- The time-series dimension; and
- The cross-sectional dimension.

On the first, Gersbach and Rochet propose a very clear and operational objective – stabilising credit cycles. As credit fluctuates more than GDP, macroprudential policy should aim at reducing the fluctuations in credit. In a more general setting, Claessens and co-authors show that the housing and credit cycles coincide and contribute to the building up of financial imbalances, while the equity cycle is less relevant. They recommend countercyclical capital buffers in combination with limits on mortgage lending, such as loan-to-value caps or debt-to-income caps.

Another emerging macroprudential instrument that can limit credit growth is the leverage ratio of the banking system. Gersbach shows that this ratio is sufficiently independent of the short-term interest rate used in monetary policy. This helps to apply the Tinbergen 'assignment' rule, namely using different instruments to achieve each of the objectives. Finally, Perotti and Suarez call for a liquidity charge on short-term funding, to internalise the social costs of high-risk banking.

Moving from banking to insurance, the new Solvency II capital framework also allows for a macroprudential approach. Solvency II defines a Minimum Capital Requirement, which should always be met, and a higher Solvency Capital Requirement, which may be breached. The main purpose is to define a ladder of supervisory actions when the Solvency Capital Requirement is breached. But it also permits the use of Borio's

macro-lens by allowing a longer recovery period during recessions and no (or very short) shortfalls during booms. The Solvency Capital Requirement would thus act as a countercyclical buffer.

It is interesting to note that most economists have more affinity with the time dimension than with the cross-sectional dimension. Nevertheless, the cross-sectional dimension is moving to centre stage when it comes to macroprudentialism. There are (political) calls for high systemic capital surcharges for the large banks to reduce the 'too-big-to-fail' subsidy, as Favara and Ratnovski point out in their chapter. Several countries - such as Switzerland, the US, the UK, Sweden and the Netherlands - have introduced higher capital charges for their large banks.

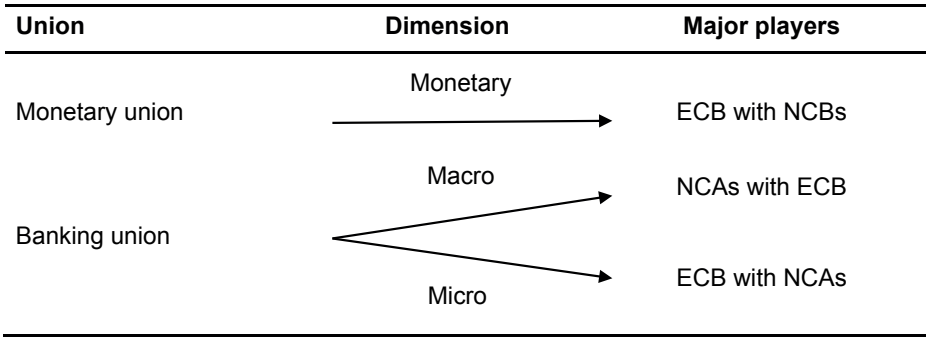
Another structural instrument is to reduce large exposures. In the aftermath of the Eurozone Crisis, there have been calls for the introduction of large-exposure rules when it comes to exposure to sovereign debt. From a risk perspective, these large-exposure rules are more important than risk weights for sovereigns.

Outstanding issues

Special considerations apply to the Eurozone in the presence of the monetary and banking union. Macroprudential policy is even more important in a monetary union. With a 'one-size-fits-all' monetary policy, pro-active macroprudential policies are needed to address financial imbalances at the country level.

While there is broad consensus that the financial cycles differ at the country level, there is no consensus on the appropriate level of coordination. Figure 2 depicts the current division of powers. In monetary and supervisory policy, the ECB takes the lead with some contributing role for the national central banks (NCBs) and the national competent authorities (NCAs). In contrast, in macroprudential policy the NCAs have the first say, with the ECB on the back bumper.

Figure 2 Policy framework for the Eurozone



In this volume, Sapir and also Acharya and Calomiris argue for a strong role for the ECB. I would like to reinforce this point. If too much is left to the national level, emerging financial imbalances may go unchecked in some countries. Next, there is a risk of inconsistent application of macroprudential tools, while there are strong cross-border stability effects within a monetary and banking union. Moreover, a consistent policy framework for a broader financial union suggests the alignment of policy tools at the same level.

Entering a new era

As the macroprudential toolbox is slowly being filled with new instruments, central banks are having to learn how to use them. This will not be easy since the exact effect depends on the specifics of a country's financial system and there may be unintended consequences (see the chapter by Wagner). International experiences are of limited use. Macroprudential policy, just like monetary policy, is more of an art than a science. While central banks tend to be cautious, the high costs of financial crises suggest that it may be better to err on the side of a pro-active macroprudential policy stance, as Gersbach points out in his chapter.

Macroprudential policy requires complete independence from short-term political pressures to deal with the inherent conflict between the short term and the long term. This is why independent agencies, such as the central bank or the financial supervisory authority, are made responsible for macroprudential policy. This requires adequate arrangements for democratic accountability, as macroprudential decisions, such as lowering the loan-to-value ratio, can have a major impact on citizens.

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Part I

Setting the scene

The use of macroprudential instruments

Charles A E Goodhart
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As the Global Financial Crisis struck, central banks were saddled with two objectives at the same time: price stability and financial stability. With the policy interest rate predicated to achieve price stability, we needed a second instrument to maintain financial stability; hence macroprudential instruments. This chapter discusses how and why macroprudential instruments might work, as well as in what way they have been implemented so far. As long as macroprudential instruments are able to vary the capital ratio applicable to loans, they could be effective, but only time will show how effective.

The onset of the Global Financial Crisis in 2008 shattered the myth that the central bank's functions could be limited to using a single instrument, the interest rate, for achieving a single objective, price stability, as generally represented by an inflation target. Inflation targets had, in most developed countries, been successfully met in the years leading up to the Crisis; nevertheless financial instability occurred, with a boom in housing, property and bank credit giving way to a financial bust of epic, global proportions.

Some had argued, even prior to the Crisis, that central banks could, and should, have leant against the wind in their use of their single interest rate instrument. But using one instrument to achieve two objectives would often lead to a failure to succeed sufficiently in either objective. Others argued that the inflation target itself should be amended, or even scrapped. In view of the earlier history of worsening inflation in the 1960s and

1970s, the struggle to rein back inflation in the 1980s, and the success of the Great Moderation in the 1990s and 2000s, few central bankers agreed.

So central banks became obligated to achieve two objectives: financial stability as well as price stability. While this had historically been a central function for those central banks operating in the 19th century, when adherence to the Gold Standard ensured the maintenance of price stability, it had not been foremost in the minds of those preparing a legal mandate for more recently established central banks. Clauses relating to such matters as maintaining a well-running payment systems were stretched in concept to cover financial stability overall as well.

Anyhow, after the Crisis struck, central banks then found themselves saddled with two responsibilities and objectives: financial stability as well as price stability. If you have two objectives, the Tinbergen principle indicates that you need two (sets of) instruments to achieve both ends satisfactorily. This need was seen almost as soon as the Crisis struck (Brunnermeier et al. 2009), and the set of instruments designated for this role were given the title of 'macroprudential instruments'.

What?

The main threat to financial stability has mostly come from the banking system, though the experience of the Tulip mania, the South Sea Bubble and other manias show that this is not necessarily so (Kindleberger and Aliber 2011). The banking system combines high leverage with massive maturity mismatch (liabilities of much shorter duration than assets), which makes them liable to runs. In recent decades this mismatch has been aggravated by the increasing weight of property-related loans, especially housing mortgages, in banks' portfolios (Jorda et al. 2014). But in the interwar period, it was the banks' involvement with stock exchange financing that in the US often provided the trigger for panics.

Anyhow, under current circumstances it is conditions in banks and shadow banks on the one hand, and in housing and property markets on the other, that are the main focus for macroprudential concerns, though derivative markets more generally are a further, but usually secondary, worry.

Any bank that is over-leveraged, with insufficient equity, and holds relatively few liquid assets (i.e. with an excessive mismatch) is a danger to itself and to the financial system more broadly. So reforms have been set in place – Basel III, the Liquidity Coverage Ratio, etc. – to strengthen both individual banks and the banking system more widely at all times. These go under the general heading of 'microprudential measures'.

In contrast, macroprudential instruments are intended to be counter-cyclical – to tighten during the boom over asset (housing) prices and credit expansion, and to be relaxed, or even removed entirely, during the subsequent slump. Also they are to be applied usually to all banks, irrespective of that bank's individual position, because of macroprudential concern with the system as a whole. Although the basic concern is systemic, it may, and does, frequently relate to components of the financial system, such as the housing market (or even to sub-parts of that market) and parts of the banking (and shadow banking) systems – OTC derivatives or investment banking, for example – and, as such, is often granular. In particular, it is much more granular than the use of interest rates in monetary policy more broadly.

So its defining characteristics involve being more counter-cyclical than microprudential policy and more granular than the interest rate policy of the monetary policy committees around the world. Into this bucket are added state-varying capital and liquidity requirements for banks and state-varying margin controls for various asset markets, such as loan-to-value (income) ratios (LTVs/LTIs) for mortgages.

Who?

I have argued that central banks have now been allocated responsibility for financial stability, whether keen to do so or not. If so, it would seem odd not to also give them command over the main levers (i.e. instruments) for achieving such stability. Moreover, several of these instruments involve either imposing requirements on banks – e.g. state-varying capital requirements – or changes to the central bank's own portfolio – e.g. acting as market-maker of last resort via credit expansion (CE) – that would seem necessarily to be within the natural province of central bank decision-making.

Nevertheless some countries, such as Sweden, have given part, or all, of control over macroprudential policymaking to a separate body, usually the institution(s) with responsibility for microprudential measures. The reasons for this include the following:

- Democratic concern about the award of excessive powers to an unelected technocratic institution.
- Fears that concern over financial stability may distort the pursuit of the more important price stability objective.
- Concern that the objective of achieving financial stability may lead the central bank into areas of policy, notably in setting LTVs or LTIs in housing markets, that involve other political or quasi-fiscal considerations that should be *ultra vires* for a central bank.

In those, still perhaps relatively few, instances where the exercise of macroprudential powers has been awarded to some other regulatory body, i.e. *not* to the central bank, the obvious and natural interest of the central bank in how such powers are being exercised has generally meant that there is an oversight committee in which both bodies participate, with the Treasury in the Chair, capable of resolving disagreements between the two main parties. The Financial Stability Oversight Committee (FSOC) in the US is an important example. It is too early to tell how such oversight committees will work;

the experience of the Tripartite Committee in the UK in 2007-10 was not particularly encouraging.

Whereas the normal problem is whether to allocate decisions on macroprudential instruments to the central bank or to a separate regulatory authority, the issue in the Eurozone is rather different, namely whether to make the ECB responsible for such decisions or to leave them with the national central banks (NCBs). At the moment the tide is flowing strongly towards giving such powers to the ECB, for the same kind of reasons that led to it becoming the single supervisory authority. Even so, the marked institutional differences between some asset markets, such as the housing market, in the different Eurozone countries and the need for 'macropru' to be much more granular in operation, than either micropru or monetary policy, could eventually tell in the opposite direction.

How?

The use of macroprudential instruments is still pretty much in its infancy. Its previous main use has been in small states, such as Hong Kong, with currency pegs. This meant that macropru was about the only counter-cyclical monetary policy instrument that they could deploy. The results are generally felt to have been beneficial; in the right direction, but not really sufficient to maintain the desired level of stability.

There is hardly any experience of larger countries with a floating rate using such an instrument. While the FSA in Sweden has adopted macroprudential measures to try to calm the housing market there, the Riksbank has tended to claim that not enough had been done.

The Financial Policy Committee (FPC) in the UK has sought to side-step potential political concerns about intrusion into the politically sensitive housing market by focussing their measures on guidance on how *banks* should operate in that market. Proposals about the conduct of bank mortgage business, the Mortgage Market Review

(MMR), and limits on bank issuance of high LTI mortgage loans are examples. Currently the UK housing market appears to be cooling and stabilising, which is encouraging, though causation is always hard to demonstrate.

Prior to the onset of the Crisis, the majority of analysts placed most weight on the rate of growth of the monetary base as the determinant of broad money growth and bank credit expansion, in a bank multiplier analytical context. In the aftermath of QE, and with the combination of a massive increase in bank reserves in conjunction with sluggish monetary expansion, that analytical framework has collapsed. Particularly at a time of sharply rising required bank equity ratios, much more analytical weight is now being placed on bank (equity) capital as the crucial constraint on credit expansion (for some supporting recent empirical work, see Aiyar et al. 2014).

In so far as a main potential macroprudential instrument is the ability to vary the required capital ratio applicable either to all loans or to loans of a particular type (e.g. mortgages of certain kinds), this suggests that macroprudential instruments could be more efficacious than some of us had feared, and have a quite separate effect from the standard variation in policy rates decided by MPCs. But only time will tell.

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Part II

System objectives

A programme for improving macroprudential regulation[1]

Anil K Kashyap, Dimitrios P Tsomocos and **Alexandros P. Vardoulakis**
University of Chicago; University of Oxford; Board of Governors of the Federal Reserve System

Macroprudential polices broadly refer to the regulations that promote financial stability. As such, they have been highly endorsed by central bankers. In this chapter, the authors propose three principles for improving macroprudential regulation. They argue that macroprudential frameworks should incorporate forward-looking behaviour and should account for the different functions of the financial system. Finally, regulatory discussions are most constructive when they are precise about which frictions create divergences between privately and socially optimal decisions.

1. The state of macroprudential regulation

While virtually every central banker in the world is on record supporting the concept of 'macroprudential regulation', there is still no agreed upon definition of what it means or how best it should be implemented. We define macroprudential regulation as referring to regulations that are designed to foster financial stability. This of course shifts

1 This paper draws heavily from earlier work that was published in the Banque de France *Financial Stability Review*. The views in this chapter are those of the authors alone and do not necessarily represent those of the institutions with which they are affiliated. The authors are solely responsible for any errors. Kashyap thanks the Initiative on Global Markets at Chicago Booth and the National Science Foundation through a grant administered by the National Bureau of Economic Research for research support. Kashyap's disclosures of his outside compensated activities is available at http://faculty.chicagobooth.edu/anil.kashyap/.

the problem to defining 'financial stability'. For this, we favour a pair of definitions proposed by Eric Rosengren (2011):

> *"Financial stability reflects the ability of the financial system to consistently supply the credit intermediation and payment services that are needed in the real economy if it is to continue on its growth path."*

> *"Financial instability occurs when problems (or concerns about potential problems) within institutions, markets, payments systems, or the financial system in general significantly impair the supply of credit intermediation services – so as to substantially impact the expected path of real economic activity."*

We like Rosengren's definitions for three reasons. First, they rightly make the goal of delivering financial stability as supporting the real economy. This immediately implies that activities that are superfluous to supporting growth are correctly seen as non-essential ones that could be jettisoned. Second, he takes a broad view of what the financial system does to support the economy. As we explain below, his focus on intermediation and payment services matches well with the academic literature on this issue. Third, he emphasises threats that come not only from problems that actually materialise, but also those that simply might arise and emphasises the need to guard against both.

Armed with this definition, we can see that we are in the midst of a number of experiments in different countries on how best to proceed. For instance, in the US a committee consisting of heads of various regulators has been charged with the responsibility of addressing these issues. In contrast, in the UK almost all of the responsibility has been given to the Bank of England. And in other countries there are a variety of intermediate arrangements, such as the creation of new agencies or shared responsibilities involving the central bank and other regulators. Hopefully, this experimentation will lead to some agreement on best practices. But in the meantime, I believe we can already draw some lessons that should be helpful in guiding these efforts.

2. The role of the financial system

To proceed, one must start by specifying how intermediation and payment services support economic activity. Economists have offered three theories for how this might work. The first presumes that certain financial institutions can expand the amount of credit that borrowers can obtain (say, relative to direct lending by individual savers). The micro-founded theories typically assume that borrowers can potentially default on loans and so any lender has to be diligent in monitoring borrowers (Diamond 1984). By concentrating the lending with specialised agents, these monitoring costs can be conserved and the amount of credit extended can be expanded.

A second widely posited role for the financial system is helping people and businesses share risks (Benston and Smith 1976, Allen and Gale 1997). There are many ways to formalise how this takes place, but one simple one is to recognise that by banks offering both deposits and equity to savers, the banks can create two different types of claims that would be backed by risky loans. These two choices allow savers to hedge some risks associated with lending and this hedging improves the consumption opportunities for savers.

A third role, which the literature recognises as complementing the second, is having a financial system that creates liquid claims that facilitate transactions. There are various motivations behind how this can be modelled. In Diamond and Dybvig (1983), a financial intermediary can cross-insure consumers' needs for liquidity by exploiting the law of large numbers among customers. But doing so exposes banks to the possibility of a run, which can be disastrous for the bank and its borrowers and depositors. Calomiris and Kahn (1991) and Diamond and Rajan (2001) explain that the very destructive nature of a run is perhaps helpful in disciplining the bank to work hard to honour its claims. So the fragility of runs is potentially important in allowing both high amounts of lending and large amounts of liquidity creation.

3. Guiding principles

These observations about the role of the financial lead us to a first principle for regulatory design:

Principle #1: Any satisfactory framework for analysing financial stability and macroprudential regulation should be rich enough to account for all three of these contributions of the financial system.

It is perhaps easiest to appreciate the importance of this principle by looking at some examples that violate it. One prominent policy proposal that is often held up as an appealing alternative to current bank regulations is to insist that banks hold only liquid securities as assets (Kotlikoff 2010). The creation of these narrow banks would eliminate the risk of a bank run and still allow banks to provide liquid assets to their customers. One might imagine that banks could even be profitable if they were to buy large denomination securities and, using the law of large numbers, to manage the transactions costs of selling them when cash is needed for customers.

This kind of proposal is superficially appealing but it excludes the credit creation function of the banking system. Hence, if implemented, it would force that activity away from the banks. The theoretical work (and associated empirical work such as Kashyap et al. 2002) that shows there are synergies from combining liquidity provision and credit extension suggests that this solution would be inefficient. Employing a model that bakes in the assumption that there are no efficiency costs from decoupling lending and liquidity provision is misguided.

Likewise, in the aftermath of the Global Financial Crisis many economists have argued that bank capital requirements are far too low. An extreme example of this is Admati et al. (2010), who advocate creating a banking system that creates no liquid claims against its risky assets. Again, this bank will be free of runs and able to absorb credit losses without needing any taxpayer support. But the arrangement supposes that liquidity provision is not a core function of banks and that precluding them from providing

liquidity is costless. So this type of analysis also strikes us as incomplete and ill-suited as a starting point for regulatory design.

A corollary to this observation is that the financial system must be conceived of as doing more than just taking savings and turning them into investment (since this ignores liquidity provision as well). There is no doubt that many analyses of macroprudential regulation do not respect our first principle.

We have pursued an approach that does respect the first principle in Kashyap et al. (2014). In that paper we explore a number of regulations that correct distortions that arise from limited liability and bank runs. That analysis leads to our second principle.

Principle #2: Any satisfactory framework for analysing financial stability and macroprudential regulation should incorporate forward-looking behaviour and have prices that adjust endogenously to reflect potential risks.

At a technical level, this principle implies that the analysis should be conducted in a general equilibrium environment so that the endogenous actions that agents take to counteract the various distortions are reflected in prices. There are several other reasons to favour a general equilibrium approach. By deriving behaviour from utility maximisation with rational expectations and market clearing, the model will specify coherent behaviour, even if policy essentially changes the regime in which an agent operates. This kind of approach also makes it possible to conduct welfare analysis.

At a practical level, this principle opens up a role for both ex ante regulation that deals with incentives to avoid problems and ex post policies that seek to mitigate the damage after bad realisations occur. Many policy discussions can be confusing because the environment is not rich enough to allow for both these types of policies. By respecting this principle, we can be assured that the framework does not presuppose that either the ex ante *or* ex post approach is necessarily better.

One example where this principle has bite concerns capital regulation. Models satisfying Principle #2 recognise that savers need to be induced to invest in bank equity and that

return on equity needs to be compared to other potential investments. Depending on the rest of the environment (e.g. whether there is limited liability or the possibility of regulatory arbitrage), this can create interesting interactions between the level of required capital and the lending decisions made by banks (such as reaching for yield).

Finally, this leads to our third and perhaps most important principle:

Principle #3: Regulatory discussions are most constructive when they are precise about which frictions create divergences between privately optimal and socially optimal decisions.

Economists generally take the view that directly attacking a distortion and correcting it is better than indirectly addressing an implication of distortion. But knowing whether a direct fix is possible requires more specificity than is often spelled out.

In the macroprudential context, this usually amounts to asking for clarity about which assumptions are necessary for the Modigliani-Miller (MM) propositions to obtain. When the MM conditions are satisfied, capital structure is indeterminate, so borrowing and lending arrangements are irrelevant.

Unfortunately, once we expand the analysis to include the role of liquidity provision, this objective becomes even more challenging. There is no analogue to the MM propositions that delivers a natural benchmark (in a general setting) for the socially optimal amount of liquidity creation (Kashyap 2014). Absent a social efficient (or constrained efficient) benchmark, it is hard to know whether private, unregulated actions are leading to too little or too much liquidity creation.

This is observation is of considerable practical importance. The main decisions regarding liquidity regulation thus far presume that banks will be required to satisfy both a net stable funding ratio and a liquidity coverage ratio. Loosely speaking, the first requirement amounts to a restriction on the amount of short-term debt that can be issued, while the latter applies to the asset composition for the institutions. However, in most models of corporate finance, the 'net debt' is what matters.

The question of why net debt is not a sufficient statistic immediately invites the question of why two independent regulations are needed. The fact that we do not even have a simple way of explaining that shows how far we have to go if we are to respect our third principle. Yet, unless we set ourselves the goal of being able to address such basic questions, it seems unlikely to me that we will meet our macroprudential objectives.

More generally, in Kashyap et al. (2014) we find that when all three principles that we are espousing are respected, there are several reasons why private and socially optimal decisions can diverge. It is not surprising to us that correcting the various distortions requires multiple regulatory interventions. Of course, there are many ways in which this can be accomplished, which is why more research comparing and contrasting them seems especially urgent.

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Macroprudential frameworks: (Too) great expectations?[1]

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The Global Financial Crisis has highlighted the need for a focus on the system as a whole to help secure financial stability. Macroprudential frameworks have subsequently gained popularity. This chapter cautions, however, that they are still a work in progress. Not only is there scope for improvement in macroprudential frameworks, but other policies – not least monetary and fiscal – should also play a role. Macroprudential frameworks therefore must be part of the answer, but they cannot be the whole answer.

"Take nothing on its looks; take everything on evidence. There's no better rule."

Charles Dickens, Great Expectations

Introduction

If there is one lesson from the Global Financial Crisis that has been embedded in policy, it is the need to put in place macroprudential frameworks. Following the Crisis, the term 'macroprudential' went from virtual obscurity – the idiom of a few cognoscenti – to rock-star status almost overnight, with the international community's full endorsement (G20 2009, FSB-IMF-BIS 2011a). This was source of some satisfaction at the Bank for International Settlements (BIS), which had been strongly advocating the need for such an approach for many years (Clement 2010).

1 A slightly shorter version of this chapter was published in the 25th anniversary edition of the *Central Banking Journal* (Borio 2014a).

The lesson is welcome and important. There is no doubt that macroprudential frameworks must be part of the solution to the perennial quest for the so far elusive goal of lasting financial stability. Adopting a more systemic orientation in prudential arrangements is essential.

But intellectual pendulums have a habit of swinging too far. There is a risk of entertaining unrealistic expectations about what macroprudential schemes can do on their own. If these expectations become entrenched in policy, there is even an outside risk that, far from being part of the solution, macroprudential frameworks could paradoxically become part of the problem. Complacency is always not too far around the corner. If the quest for financial stability has proved so elusive, it must be for a reason.

Put differently, macroprudential policy *must* be *part* of the answer but it *cannot* be the *whole* answer. Other policies also need to play their part, not least monetary and fiscal policy. And making the most of macroprudential frameworks calls for a mix of ambition and humility – ambition to make systematic use of the available tools; humility in recognising their limitations.[2]

This chapter develops this basic point by considering various aspects of macroprudential frameworks: objectives, strategy, tools and governance, both nationally and internationally. But before delving into these aspects, it is worth recalling what macroprudential frameworks are about.

The systemic dimension takes centre stage

Macroprudential frameworks have been the response to prudential regulatory and supervisory arrangements that were too heavily focused on *individual institutions.* By tending to target institutions on a standalone basis, such 'microprudential' approaches had two drawbacks. First, they set the same standards *regardless of the impact* of an

2 For a further elaboration, see Borio (2011) and, on the contours of macroprudential policy, Caruana (2010a).

institution's failure on the financial system. It is as if the same speed limit applied to both trucks and cars. Second, they set the same standards *regardless of the financial system's condition*. It is as if the same speed limit applied irrespective of traffic conditions. In effect, the microprudential approach assumes that the sources of risk – asset prices, credit conditions and the macroeconomy – are independent of what financial institutions collectively do, i.e. they are what economists call 'exogenous'.

What this makes clear is that, in fact, the term 'macroprudential' does not refer so much to a new policy, but to an intellectual orientation or lens through which the task of achieving financial stability is understood. While this orientation suggests ways of designing the tools, the tools remain 'prudential' ones.

The macroprudential approach addresses the two drawbacks head-on by focusing on the system as a whole rather than on individual institutions – on the wood rather than the trees (Crockett 2000, Borio 2003). The approach calibrates prudential standards with respect to both the systemic footprint of individual institutions (the so-called 'cross-sectional dimension') and the evolution of system-wide risk (the so-called 'time dimension'). In so doing, it also addresses what has come to be known as the 'procyclicality' of the financial system – those self-reinforcing processes that amplify financial booms and busts ('financial cycles') and are at the root of financial crises.

Post-Crisis, policy has addressed both dimensions. Basel III illustrates this quite well. Capital surcharges for systemically important banks (SIBs) and the countercyclical capital buffer target the cross-sectional and the time dimensions, respectively (BCBS 2010a,b; 2012a,b). But Basel III is just the core of a much broader response. Examples range from efforts to put in place orderly resolution schemes for SIBs, or to centralise the clearing of derivatives, to the adoption of a whole set of instruments to deal with the build-up of disruptive financial booms, including minimum loan-to-value (LTV) and debt-to-income (DTI) ratios, to name just two.

Addressing the cross-sectional dimension raises thorny issues. For instance, the pace at which central clearing has gained ground has proved disappointing. At the same

time, there are legitimate concerns about the risk of concentrating too much risk in central clearing counterparties (CCPs). As a result, a lot of work has been done to develop adequate recovery and resolution procedures for these key players (CPSS 2012). Likewise, despite all the efforts under way, putting in place adequate resolution procedures for SIBs is still very much a work in progress and faces huge challenges.[3] And tricky questions arise about how best to deal with non-bank financial institutions, including the shadow banking system (Caruana 2014).

Even so, the time dimension is probably more controversial. It is here that macroprudential policy inevitably intersects with macroeconomic policy. The debate about their relationship is in full swing. Given space limitations, therefore, what follows focuses on this dimension.

What objective?

What should be the objective of macroprudential policy in the time dimension? Two possibilities should be distinguished: the first is to *increase the resilience* of the financial system; the second is to *constrain financial booms*. These objectives are sometimes referred to, respectively, as protecting the banks from the financial cycle and protecting the financial cycle from the banks (or taming the financial cycle).

The second objective is much more ambitious than the first. In order to increase the financial system's resilience, it is sufficient to build up adequate buffers in good times for the system to withstand a bust. In effect, all macroprudential tools do precisely that – provided, of course, they are vigorously deployed. By contrast, when it comes to constraining financial booms, the build-up of the buffers should also succeed in reining in the growth of credit and asset prices as well as risk-taking.

3 For a useful narrative of the efforts under way, see FSB (2013).

My reading of the growing empirical evidence is that the effectiveness of macroprudential measures in achieving this more demanding objective is limited, especially for the typical range of variation in the instruments. To be sure, some tools do work better than others. For instance, DTI ratios and, to a lesser extent perhaps, LTV ratios are comparatively more effective than increases in loan provisions or capital requirements.[4] Indeed, the recent activation of the Basel III countercyclical capital buffer in Switzerland seems to have had little impact on pricing and credit extension. It is no coincidence that the explicit objective of this buffer, as clarified in the Basel III framework, is to increase resilience, not to restrain the boom; restraining the boom is regarded simply as a desirable side benefit if it materialises. The limited effectiveness of the tools should not be that surprising. Similar constraints were extensively tried in the 1970s, albeit under different names (e.g. hire-purchase restrictions). And the results were not that different.

The main reason is regulatory arbitrage. Money, like water, has a nagging habit of finding the point of least resistance. And the tighter and more permanent the macroprudential measures get, the stronger the incentive to engage in arbitrage becomes. This suggests that macroprudential policy cannot bear the whole burden – a point to which I return below.

The risk of unrealistic expectations applies not just to the boom, but also to the bust. And here the risk is, if anything, even greater.

A common view is that the objective of macroprudential policy during a bust should be to boost credit growth. This is seen as the mirror image of the objective of restraining credit growth during the boom. It is a small step from here to feeling disappointed when the tool proves unfit for purpose.

4 For some recent cross-country empirical evidence, see Lim et al. (2011), Claessens et al. (2013) and Kuttner and Shim (2013).

This, however, is the wrong objective, for it fails to recognise the fundamental asymmetry between booms and busts. The right and more realistic objective is to prevent *unnecessary* constraints on the supply of credit. The legacy of the boom is too much debt. This debt overhang has to be reabsorbed if the basis for a lasting, self-sustained and sound recovery is to be established (Borio 2014b). In the meantime, the demand for credit is necessarily weak: people want to pay back what they borrowed on the basis of overly optimistic expectations. There is, in fact, growing evidence for this effect, which is also why post-bust recoveries are credit-less.[5] To expect credit to grow strongly during the bust is both unrealistic and counterproductive.

How can one remove unnecessary constraints on credit supply? One precondition is to ensure that buffers are high enough to start with, so that markets do not become the constraining factor, at least for long. This is not easy, since markets become very demanding as financial strains emerge. In addition, it is worth thinking of ways to maximise the size of the buffer once the bust occurs. One option is to more actively use restrictions on dividend payments. If the restrictions were applied to the sector as a whole, rather than to specific institutions, the risk of unwelcome procyclical effects would be mitigated, as this would eliminate any stigma (the so-called 'signalling effect'). No stigma can apply if everyone is in the same boat and the decision is taken by supervisors, not the banks themselves.

5 On the importance of deleveraging following crises and credit-less recoveries, see Calvo et al. (2006), Takáts and Upper (2013) and Bech et al. (2014).

What tools and strategy?

This analysis also has implications for the range of tools and their deployment strategy.

It suggests that a few well-targeted tools may be superior to a vast array.[6] The risk of a vast array is that policymakers may soon find themselves extending the range of measures and inadvertently drift into credit allocation. And the temptation to resort to capital controls to underpin macroprudential instruments could at some point become quite strong, even where a more vigorous use of standard macroprudential tools could be superior. This puts a premium on well-designed governance arrangements; the authorities need to have control over the proper set of instruments and be mandated to use them to limit systemic risk rather than to pursue more ambitious goals. For instance, it is not surprising that in countries where macroprudential frameworks are not yet in place, some central banks have relied on monetary tools (e.g. reserve requirements) as an alternative. Nor is it surprising that reliance on a broad set of tools, including capital controls, has gone hand in hand with the pursuit of more ambitious goals, such as managing the business cycle, for which macroprudential frameworks were not originally intended.

The analysis also suggests that, to the extent that they are feasible, rules-based arrangements can help. They can limit the risk of regulatory drift. And, when the party gets going, they can stiffen policymakers' resolve to take the famous punchbowl away. Very much as in fiscal policy, automatic stabilisers are especially useful. For instance, very conservative LTVs or DTIs or even leverage ratios can limit the need for discretionary action, varying the calibration of the tools with economic conditions.[7] To be sure, there are clear limits to how effective automatic stabilisers can be, especially since financial imbalances come in various shapes and sizes. Even so, if arrangements

6 For a discussion of possible tools, see, for instance, CGFS (2012).

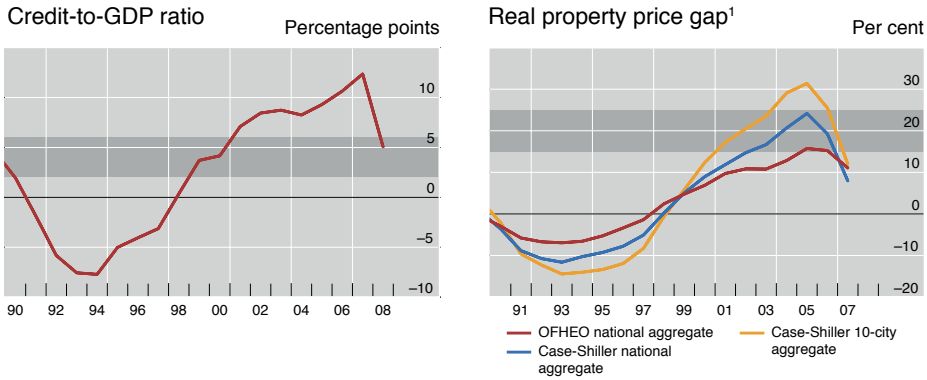
7 Another possibility is to rely more on simple and transparent indicators that have proved reliable in the past, such as the credit-to-GDP gap, used as reference guide for the countercyclical capital buffer. For a discussion of a range of candidate indicators and the role of this variable in particular, see Drehmann et al. (2011) and Drehmann and Tsatsaronis (2014).

across the world are considered, the impression is that the balance between rules and discretion is probably too heavily tilted towards discretion.

The increasing popularity of macro stress tests illustrates some of these potential risks. As discussed in detail elsewhere (Borio et al. 2012), such tests can be very useful tools for crisis management and resolution, helping to repair balance sheets once a crisis has erupted. They are also extremely helpful in bridging the hugely different perspectives of macroeconomists, prudential supervisors, risk managers and bank managements, thereby fostering a badly needed common culture. But, as early warning devices to identify vulnerabilities in tranquil times, they have so far proved woefully deficient. Their effectiveness is undermined by limitations of the modelling technology, not least the ability to capture sudden changes in behaviour, and by the context, not least the 'this-time-is-different' syndrome (Reinhart and Rogoff 2009). No macro stress test, in fact, identified the serious vulnerabilities that ushered in the financial crisis. While improvements have been made, there is a risk of putting too much faith in the tool's remedial properties.

By contrast, simple leading indicators of the build-up of risks have proved more reliable. Their strength is that they capture what is common across financial crises. In particular, the indicators we have found most useful at the BIS are based on the positive deviations of the (private sector) credit-to-GDP ratio and of asset prices, especially property prices, *jointly* exceeding their respective historical trends (e.g. Borio and Lowe 2002, Borio and Drehmann 2009). We may think of these indicators as real-time proxies for the build-up of financial imbalances: the deviations of asset prices provide a sense of the likelihood and size of the subsequent reversal; those of the credit-to-GDP ratio provide a sense of the loss-absorption capacity of the system. These indicators flashed red in the US in the mid-2000s, even out of sample (Figure 1).

Figure 1 Leading indicators of banking crises: The US example



Notes: The shaded areas refer to the threshold values for the indicators calibrated over the period 1980-2003: 2–6 percentage points for credit-to-GDP gap; 40–60% for real equity price gap; 15–25% for real property price gap; and 5–10% for real aggregate asset price gap. The estimates for 2008 are based on partial data (up to the third quarter). 1 Weighted average of residential and commercial property prices with weights corresponding to estimates of their share in overall property wealth. The legend refers to the residential property price component.

Source: Borio and Drehmann (2009).

What governance?

Everyone would agree that good governance calls for a seamless alignment of instruments with the know-how and willingness to use them based on clear mandates. Efforts to put fully fledged macroprudential frameworks in place have sought to do precisely that, guided in part by the work of international organisations under the G20's aegis (FSB-IMF-BIS 2011a,b).

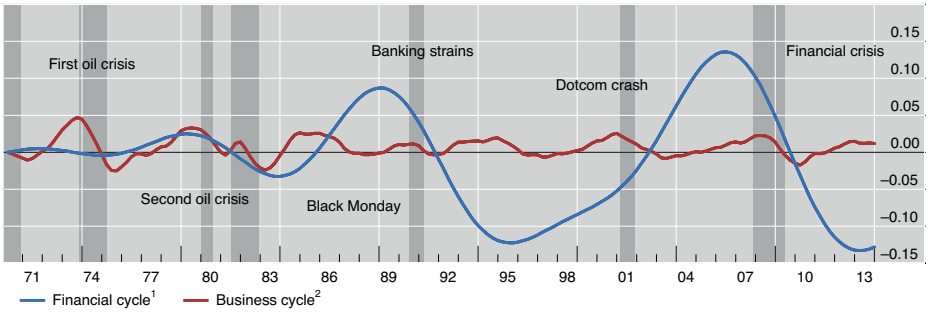
Three governance issues merit special attention: the extent of insulation from political cycles, the tension between microprudential and macroprudential perspectives, and international coordination.

A degree of insulation from political cycles is even more important in macroprudential than in monetary policy. As noted, the essence of good macroprudential policy is to take the punchbowl away just as the party gets going. And this is even harder than in the case of monetary policy. First, the lag between measures and outcomes is longer: as extensively documented, the financial cycle, which is relevant for financial stability, is

much longer than the business cycle, which is seen as relevant for inflation (Drehmann et al. 2012).[8] This is illustrated in Figure 2, which compares the financial cycle (blue line) – measured here by a combination of the behaviour of credit and property prices – with the business cycle (red line) based on standard statistical filters. Financial crises tend to coincide with peaks in the financial cycle, but the expansionary phase can last as long as a decade. Second, while some well-established constituencies are ranged against inflation, hardly any exist to combat the dizzying but illusory feeling of getting richer during a boom. Finally, some of the policy instruments have more obvious distributional consequences, which strengthens political economy resistance to their activation.

All this heightens the risk of an inaction bias. To be sure, this risk is necessarily country-specific, varying with intellectual and institutional traditions. But it can be increased by a prominent involvement of the finance ministry in decision-making. Looking across countries, ministries often have a leading role in the setting of macroprudential measures.

Figure 2 The financial and business cycles: The US example



Notes: 1 The financial cycle as measured by frequency-based (bandpass) filters capturing medium-term cycles in real credit, the credit-to-GDP ratio and real house prices. 2 The business cycle as measured by a frequency-based (bandpass) filter capturing fluctuations in real GDP over a period from one to eight years.

Source: updated from Drehmann et al (2012).

8 On this, see also Aikman et al. (2010) and Claessens et al. (2011). The result shown in the figure also holds if the length of the cycles is measured based on turning-point (peak-trough) analysis; see Drehmann et al. (2012).

Tensions may also arise, and have already arisen, between the macroprudential and microprudential perspectives. Authorities in charge of the safety and soundness of individual institutions may at times find it harder to draw the link between macroeconomic developments and the fortunes of institutions: for historical reasons and given the importance of operational responsibilities, legal and accounting backgrounds dominate. Therefore, the authorities may naturally put less weight on the dangers of financial booms as long as financial institutions appear well capitalised. This, too, can heighten the risk of an inaction bias. For instance, in Switzerland, the supervisory authority (FINMA) openly opposed the central bank's proposal to activate the countercyclical buffer. And similar differences of view have emerged in Sweden. This suggests that assigning a core role to central banks should be a priority.

The need for international coordination in the governance of instruments has not received the attention it deserves. A lack of coordination can make arrangements especially vulnerable to cross-border arbitrage. In fact, one of the most underestimated achievements of Basel III's countercyclical capital buffer is that it addresses this question head-on (Borio et al. 2011). The relevant exposure measure is a weighted average of an institution's exposure to different jurisdictions. And specific reciprocity clauses tackle the inaction bias. It is the host authority that activates the buffer with respect to the exposure to its jurisdiction, while the home authority can always do more but never less. This is particularly helpful whenever the exposures are large, and hence systemic with respect to the host country, but small and hence of little significance in relation to the lending institution's portfolio – a common state of affairs given the size of internationally active banks. Such reciprocity clauses could be a model for a broader set of macroprudential tools. Disappointingly, however, so far an extension of their scope has not been on the policy agenda.

Conclusion

Macroprudential frameworks are a very welcome response to the Global Financial Crisis: a stronger systemic orientation is essential to help secure financial stability. They are, however, very much still a work in progress. There is scope for improving the range of tools available, the balance between rules and discretion, and governance arrangements, both nationally and internationally.

The key to success is to blend ambition with humility – ambition to put in place frameworks that are capable of constraining financial booms and to use the tools vigorously; humility to recognise the limitations in what the frameworks can achieve on their own. The experience so far indicates that it would be imprudent to rely exclusively on these frameworks, or even prudential regulation and supervision more generally, when seeking to tame the financial booms and busts that have caused such huge economic costs. Financial cycles are simply too powerful. And they can cause real damage even if the banking system survives relatively well.

As discussed in more detail elsewhere, this suggests that other policies, not least monetary and fiscal, should also play a role.[9] In particular, the link with monetary policy has become increasingly controversial. One view is that central banks can continue to carry out their monetary policy as they did pre-Crisis, focusing on the business cycle and inflation; macroprudential policy can then take care of the financial cycle. This position, while understandable, is risky. A key mechanism through which monetary policy operates is precisely by influencing risk perceptions and risk appetite – the so-called 'risk-taking channel' (Rajan 2005, Adrian and Shin 2010, Borio and Zhu 2012).[10] Like macroprudential measures, it also critically influences the incentive and ability to borrow. But the impact of monetary policy is more pervasive – it sets the universal price of leverage in a given currency (e.g. Borio and Drehmann 2011, Stein 2013). More

9 See, for instance, Caruana (2010b), BIS (2014) and Borio (2014).

10 See Smets (2013) for a recent short review of the literature on the risk-taking channel.

generally, there is a tension in employing the two policies in opposite directions: it is a bit like driving by pressing on the accelerator and brake simultaneously – not exactly what is normally recommended.[11]

Macroprudential frameworks must be part of the answer, but they cannot be the whole answer.

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Macroprudential policy and monetary policy[1]

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There is a possible conflict between monetary policy and financial stability. This chapter discusses whether macroprudential policies could alleviate that conflict. Macroprudential policies affect financial stability and thus monetary conditions. There is no consensus, however, on whether monetary and macroprudential policies are complements or substitutes and how they should best be conducted. If the political constraints on macroprudential policies are binding, there may be a need for a compromise.

1 Policy objectives and policy conflicts

From the mid-1990s, a consensus developed that the objective of monetary policy should be price stability, as expressed by an inflation target. Even the US Federal Reserve Board, with its dual mandate of price stability and full employment, came to specify this with an inflation target. We have since learned that price stability does not ensure financial stability; hence the new focus on macroprudential policy.

1 This paper develops arguments put forward in presentations at the University of Paris-Nanterre, 17 April 2014; a CEPR-CASS-Central University of Finance and Economics-Graduate Institute Geneva conference, Beijing, 30 June 2014; the Centre for European Policy Studies, Brussels, 4 July 2014; and the Hungarian National Bank – CEPR workshop, Budapest, 16 October 2014. I am grateful for comments on these occasions and for comments by Hélène Rey on a first draft. Some of the arguments here are applied in the Eurozone context in "Monetary Union and Financial Stability", my inaugural lecture for the Tommaso Padoa-Schioppa Chair, European University Institute, 19 November 2014..

2 Disclaimer: Portes is a member of the Advisory Scientific Committee of the European Systemic Risk Board. Nothing in this presentation nor in any oral remarks should be taken to represent any view of the ASC or the ESRB.

The objectives of macroprudential policy are to limit systemic risk and to increase the resilience of the financial system: to 'protect the banking sector from the financial cycle'. The macroeconomic context is the observed procyclicality of the financial system. There is excessive risk-taking in the boom, excessive deleveraging in the bust. So conversely, policy needs to *moderate the financial cycle*: to 'protect the economy from the banks'.

A negative external shock, perhaps magnified by excessive leverage, may hit all financial institutions simultaneously, with varying impact. But if it is wide-ranging, we may expect to see fire sales of assets and the evaporation of liquidity. The multitude of bilateral exposures, in which each institution operates under asymmetric information, generates high perceived counterparty risk throughout the system. That is the basis for contagion – even if a particular institution is hit only mildly by the shock, its counterparties cannot know this and may be reluctant to deal with it. This reluctance becomes pervasive. So policy must also seek to *limit contagion.*

Monetary policy is a major influence on the environment in which financial institutions operate. If monetary policy successfully targets inflation, protracted macroeconomic stability may induce *financial instability* – the more so if policymakers can stabilise the real economy as well as the inflation rate. Confidence that policymakers have eliminated cyclicality may be counterproductive in the longer run, because it will induce greater risk-taking, excessive leverage, and a buildup of financial imbalances. Stability leads to fragility. That way lies a crash (Minsky 1986).

There is then a possible conflict between short-run macroeconomic stabilisation policy (monetary policy) and financial stability. I consider below whether appropriate macroprudential policies may alleviate that conflict. Here I note that a constraint on both monetary and macroprudential policy is a likely *political pushback* against any restriction of credit ('taking away the punchbowl') and measures that may reduce bank profits. A further problem is the development of the shadow banking sector, which erodes the effectiveness of macroprudential policies.

2 Complementary or substitutable policies

Monetary policy affects financial stability through incentives to take risks. For over a decade, some observers (e.g. Borio and White 2003) have warned that low interest rates may provoke investors into a dangerous 'search for yield', as they seek to achieve targets for returns that cannot be met by holding low-yielding relatively safe assets. Meanwhile, *fiscal policy* affects the system's vulnerability to shocks originating from the financial sector: high government deficits and debt constrain fiscal policy responses. Limits on fiscal capacity are limits on the extent to which the state can backstop the financial system in crisis times.

In turn, macroprudential policies affect the financial cycle and therefore both monetary and fiscal conditions. A recurring question in this reciprocal relationship is whether macroprudential policies are a complement to or a substitute for appropriate monetary policies.

One view is that monetary policy should aim at a single objective: an inflation target. This could alternatively be a nominal GDP target or a price level target, or even a 'dual mandate', provided that it does not include financial stability. The corresponding policy instrument is the short-term interest rate. Then macroprudential policy is complementary, with a different and broader objective of financial stability, and a range of instruments. Proponents of this view may go so far as to argue that monetary policy should simply ignore financial stability, because monetary policymakers' concern for this objective would divert their attention from the control of inflation (Weidmann 2014). This is indeed the position of the chair of the US Federal Reserve Board and the president of the ECB, in a slightly less categorical form (Yellen 2014; Draghi 2014[3]).

3 "If we see that a certain real estate market or corporate bond market, for example, shows signs of having a bubble, would this be enough to justify a different monetary policy where we would raise interest rates, when the monetary policy stance based on considerations of price stability would not justify that? The answer is 'No'."

Interest-rate policy should aim at macroeconomic target(s), while macroprudential policy deals with financial stability concerns.

Svensson (2014) goes further: "Monetary policy cannot achieve financial stability… leaning against the wind cannot solve debt problems". Indeed, when leaning against the wind results in inflation below the target, this increases the real burden of debt, which is destabilising. There is some support from theory for this position: "Contractionary monetary policy is inferior to macropru in addressing excessive leverage" (Korinek and Simsek 2014). In the boom, however, leaning against the wind a bit more than warranted by pure inflation targeting would have the advantage of limiting the growth of leveraging. Leaning against the wind to constrain leverage by raising rates when inflation is below target is dangerous, as the recent Swedish example shows – this may have pushed the economy into deflation.

Indeed, Stein (2013) and Borio (2014; and Borio and White 2003) would direct interest-rate policy somewhat towards financial stability objectives, at least in the expansionary phase of the cycle. Caruana (2014) is also concerned with the increased risk-taking that comes from extended 'ultra-low interest rates'. There is then an empirical question: Can we identify harmful effects of extended low rates on financial stability, and if there, how important are they quantitatively? The limited evidence available has been summarised by Laeven (2014): risk-taking by banks is indeed negatively correlated with the level of short-term interest rates, but the observed effect is economically small; so this is not a strong argument for altering the design of monetary policy. There are some important qualifications, in particular general equilibrium effects might go in different directions. They justify further research.

Conversely, some macroprudential policy instruments will directly or indirectly affect monetary conditions – indeed, that is often the intention. Are they therefore actually aspects of monetary policy that may run counter to the policies of the monetary authority? 'Ultra-low' interest rates may be *intended* to lead investors to take more risk,

because the monetary authority is seeking stimulus in circumstances in which risk-taking is depressed.

This potential conflict is perhaps not just a theoretical construct. Suppose that, for whatever reasons, the economy faces 'secular stagnation' (Teulings and Baldwin 2014). The economy is chronically depressed, with the full-employment level of investment requiring a very low real interest rate – so low that with inflation at its (say) 2% target, the required nominal interest rate is well below the zero lower bound. The Wicksellian natural rate is unattainable. But monetary policy tries to get there, and rates go to the zero lower bound and stay there. Then 'Ponzi borrowers' (Gros 2014) increase spending, but the authorities rightly perceive that as dangerous, so macroprudential policy tries to restrain them. To the extent that it succeeds, monetary policy has to stay exceptionally loose for longer, with even more effort needed from macroprudential policy.[4] In this situation, policymakers might wish to turn to a third tool, fiscal policy – if there is fiscal capacity.

3 The appropriate role of macroprudential policies

The IMF (2013), in an otherwise very useful paper discussing the interaction of monetary and macroprudential policies, makes some important but highly questionable assertions. First, it argues that macroprudential policy should not seek to manage aggregate demand. But of course macroprudential policies may include instruments intended precisely to affect large components of aggregate demand: housing expenditure (loan-to-value ratios, etc.), consumer durables expenditure (credit card restrictions), and private investment (ceilings on credit growth).

4 Lawrence Summers, in Teulings and Baldwin (2014), stresses this implication of secular stagnation. Pushing the real rate towards an exceptionally low natural rate will induce a 'search for yield', Ponzi financial structures, and rational bubbles in asset prices. Borio and Disyatat (2014) argue that persistently low rates induce accumulation of debt and distortions of production and investment patterns which reduce long-run growth and hence become a cause of secular stagnation: "low rates thus become self-reinforcing". They use this as an argument for raising rates even in conditions of apparently depressed demand.

Second, the paper maintains that capital flow management (CFM) is not a macroprudential policy, except when it is specifically aimed at vulnerabilities created by capital flows. But this is not a tenable distinction, and if CFM is used to counteract the impact of the global financial cycle (see below) on the domestic economy, it will (by design) affect monetary conditions.

Third, and perhaps most controversially, the IMF paper asserts that macroprudential policy should not try to control asset prices (equity yields, interest rates, exchange rates). But what about housing prices? What about valuations in other asset markets? If they are very volatile and appear stretched relative to fundamentals, then the macroprudential authority should stress-test the financial system against a large drop. This is irrespective of whether some might see a 'bubble'. We do not understand bubbles very well empirically. The role of macroprudential policy here is to identify systemic vulnerabilities, then to counteract them without using interest-rate policy.

So we must return to first principles. Typically, arguments for macroprudential measures rest on systemic externalities. There are multiple drivers: *strategic complementarities* (herding) – the interactions of financial institutions, all 'searching for yield', which generate a buildup of vulnerabilities in an expansion; *fire sales*, leading to a generalised fall in asset prices (worse if they had become way out of line with fundamentals) and a system-wide deterioration of balance sheets; and *interconnectedness*, a source of contagion.

Each externality is amenable to multiple policies – for example, capital requirements and constraints on bank asset allocation (macroprudential) can limit strategic complementarities, but interest rate rises (monetary policy) might also limit the buildup of vulnerabilities. First principles give us no clear guidance on when to use which policies, and in practice, the decisions may be made by different authorities.

4 The (global) financial cycle

The policymakers' difficulties are exacerbated by the financial cycle, which is to some extent separate from the business cycle. This is the self-reinforcing and procyclical interaction between risk perceptions (risk tolerance) and financing constraints that we noted at the outset. There is an underlying leverage cycle (Brunnermeier 2009, Geanokoplos 2010, Adrian and Shin 2012). And the financial cycle is regime-dependent: it is supported by financial liberalisation and the focus of monetary policy on inflation.

There are clear implications for both macroprudential and monetary policies (and fiscal too): build up buffers during the boom to promote resilience, while constraining the boom. Again, however, monetary 'leaning against the wind' may be inconsistent with inflation targeting, putting the burden on macroprudential. But policymakers may have even less room for action insofar as the economy is subject to cross-border influences. Recent work suggests that the financial cycle is not just domestic, but global. The global financial cycle (Rey 2013, 2014) is closely related to the monetary policies of the centre countries (especially the US due to the key role of the dollar as a funding and investment currency).[5] Transmission goes through gross capital flows and through pure price effects (one aspect of the international credit channel analysed by Rey 2014).

Here CFM may be a complement to or substitute for domestic macroprudential measures – or indeed for monetary policy. The problem for monetary policy is straightforward and well-known: the global financial cycle may generate capital flows or valuation changes for a given economy, which create monetary easing. The international credit channel amplifies fluctuations induced by monetary policy. It was widely believed that a flexible exchange rate could absorb this shock, so only countries that fixed or heavily managed their exchange rates would encounter this policy problem. But Rey's analysis

5 Cerutti et al. (2014) find that the Eurozone also has key role because of the size of its banking system and its cross-border flows. All agree that it is *gross* flows that matter (see also Borio and Disyatat 2011, Bruno and Shin 2013).

and evidence contradict this view. One aspect of the monetary authority's dilemma is clear: raising the policy rate to counteract the easing will simply attract more capital inflows – expectations of appreciation are validated, and the country may become a target in the carry trade. There is no simple answer to this except CFM (Portes and Vines 1997). More generally, monetary policy autonomy requires macroprudential measures, of which CFM may be one. Here is a key illustration of how macroprudential relates to monetary policy – the latter is ineffective without the former.

5 Macroprudential policy instruments and their effectiveness

There are many instruments of macroprudential policy, but there is relatively little experience in using them. Containing threats from excessive credit growth could involve time-varying (state-contingent) capital requirements for banks; dynamic provisioning; broad ceilings on credit growth; possibly time-varying caps on loan-to-value, loan-to-income, debt service to income ratios; and possibly time-varying margin requirements and bank reserve requirements. Containing the amplification mechanisms of systemic risk might require limits on maturity mismatches, perhaps in the form of a liquidity coverage ratio; caps on foreign-exchange lending, borrowing, or net open positions. And insulation from the global financial cycle might best be achieved with some form of capital controls on cross-border flows. Of all these instruments, those most closely overlapping with monetary policy are ceilings on lending and borrowing and reserve requirements.

We have limited evidence on the effectiveness of these measures and even less on the costs they might impose. Nevertheless, in the aftermath of the financial crisis and with a new understanding of the financial cycle, domestic and global, policymakers are already implementing or actively discussing a wide range of macroprudential interventions. Not all monetary policy authorities are willing simply to follow their targets while letting 'macropru' pick up the pieces, especially since past performance is not reassuring. Moreover, recent Swedish experience of 'leaning against the wind' is

also not positive, and monetary policy there has had to go into reverse in an attempt to stop deflation.

6 The institutional framework for monetary and macroprudential policies

The broad and deep relationships between monetary policy and macroprudential policy could in principle be managed institutionally, by putting both under the control of the same institution. The Bank of England now has the Monetary Policy Committee side-by-side with the Financial Policy Committee responsible for macroprudential measures, with some overlap in membership (Shakir and Tong 2014). The European Systemic Risk Board (which has no executive authority) is chaired by the president of the ECB. The US Federal Reserve has some macroprudential tools, but others are dispersed among several agencies.

It seems likely that putting microprudential authority (the Single Supervisory Mechanism), which does have executive powers, squarely within the ECB is likely ultimately to give the ESRB greater influence, and the two may end up operating side-by-side in the ECB. The key difficulty is that macroprudential measures, unlike monetary policy, will almost certainly have to differentiate among countries – which makes them irredeemably political.[6] Alternatively, both could be taken out from the ECB to operate independently. The political argument for this – and for a similar development in the UK structure – is that the central bank, whose independence was guaranteed by the Maastricht Treaty, is now perhaps the most powerful single institution in the polity. Is it too much power to sustain? The independence of such an institution with no political base may become problematic.

6 The argument is extended somewhat in Portes (2014). Here there is a clear difference between the monetary union of 18 countries in the EU and the situation of a macroprudential authority in even a federal state. Cross-border financial integration requires a single authority, but that authority faces major political constraints and may have to cede some decentralised competence to national authorities.

Moreover, the political economy constraints on macroprudential policies may be more difficult than those for monetary policies. The distributional effects of monetary policy are more clearly perceived now than before the crisis, and they are increasingly invoked by those who advocate 'normalisation' of interest rates (due to the effects of prolonged low rates on pensioners, etc.) Macroprudential measures, however, have much more direct and more easily identified distributional effects – constraining households in housing markets is the most obvious example and is politically very sensitive. The costs of various macroprudential measures for financial institutions are also relatively clear, as is the rise in the price of financial intermediation (spreads) arising from some measures. And these costs are set against the very poorly perceived mitigation of systemic risk that the measures intend to achieve. A different and politically evocative challenge is to label macroprudential measures as a form of 'financial repression' (Reinhart et al. 2014).

7 Conclusion

We return finally to the question of whether macroprudential and monetary policies are complements or substitutes and how they are best conducted. Svensson (2014) maintains that "each policy should be fully informed about the conduct and impact of the other policy and take that into account…[But the outcome should be a] Nash equilibrium rather than coordinated equilibrium (joint optimisation)". This follows logically from the view that monetary policy should aim solely at the inflation target. It assumes, however, that macroprudential policies can effectively ensure financial stability, regardless of monetary policy. The contrary case is put well by Stein (2013): monetary policy (interest rates) can "reach into corners of the market" that evade macroprudential policies, by setting the "universal price of leverage'". There are indeed significant political constraints on macroprudential regulation and some doubts about its effectiveness. So there may be some need for compromise.

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The political economy of macroprudential regimes

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Macroprudential regimes have been assembled in a great hurry in the wake of the Crisis, with structures varying markedly across countries as a result. This chapter explores the political economy questions in the design of macroprudential regimes. It argues that two characteristics of the financial system present major challenges for the ability of macroprudential regimes to combine effectiveness with democratic legitimacy. The need for dynamic adjustment of prudential instruments to contain boom and bust and the need for rapid responses to stability-threatening regulatory arbitrage entail a major departure from a world of static regulatory rule books. Constrained discretion is needed, which requires carefully framed legislative mandates. Both securities regulators and central banking need statutory support to adapt to this.

Over the quarter century leading up to the late 1990s, policymakers, economists and politicians invested great time and effort designing monetary regimes that could be fit for purpose in modern liberal democracies. By contrast, macroprudential regimes have been assembled in a great hurry in the wake of the Global Financial Crisis. The result has been structures that vary enormously across countries in almost every conceivable dimension: in who is in the lead (elected politicians or independent agencies); in whether the policy outputs are decisions, recommendations or exhortations; in the parts of the financial system that are covered; in the way objectives, if any, are framed; and in the extent to which a regime is rooted in legislation or amounts to voluntary cooperation amongst existing, unreformed agencies.

On the one hand, this can be seen as useful variety from which, over time, the world can learn. On the other hand, there are problems for democratic accountability except in those states where either a well-articulated statutory regime exists or, at the other end of the spectrum, an explicit decision has been taken by elected politicians that their country will not employ macroprudential policy. For jurisdictions that find themselves in between, with semi-articulated regimes, there is a need for public debate and resolution. Arguably that includes the world's biggest currency blocs. In the US, the Financial Stability Oversight Council, created by the Dodd-Frank legislation, performs some of the roles of a macroprudential body, but its powers are limited and its jurisdiction contested. Its authority is disputed even by some domestic regulators, whose agencies do not themselves have an explicit objective of preserving financial stability. In the Eurozone, it is unclear whether or not there is a macroprudential authority. Will the ECB's new microprudential body determine macroprudential policy for the currency area's banking system? What about capital markets and shadow banking? Or, as elsewhere in the EU, is macroprudential policy still a national competence within the monetary union? Even if there are definitive answers to those questions, they have not been promulgated and explained.

The purpose of this chapter is not to try to solve those particular challenges, but to step back and set out some of the political economy questions that cannot be dodged in designing macroprudential regimes and, thus, in choosing whether or not to have one.

The financial system is a system: A revolution in regulatory policy

The crisis has reminded everyone that the financial system is just that, a *system*. Its component parts are connected in myriad ways – directly and indirectly; and within sectors, across sectors and markets, and across countries. As the first chairman of the Basel Supervisors Committee, George Blunden, said in the 1980s, "[i]t is part of the …job to take [a] wider systemic view and sometimes to curb practices which even

prudent banks might, if left to themselves, regard as safe" (Blunden 1987).[1] Somehow, that fundamental precept got lost over the subsequent decades. It must not be forgotten again. If stability is to be preserved, finance needs to be regulated as a system, not as a series of notionally independent parts.

But that is easier said than done. This is a system with extraordinary dynamic characteristics. It moves through phases of boom to bust, with major economic consequences. And it reshapes itself to step around any set of *static* regulatory constraints. Those challenges – of dynamic adjustment and regulatory arbitrage – present major problems for the design of macroprudential regulatory regimes that can combine effectiveness with democratic legitimacy.

Dynamic adjustment of regulatory requirements

In explaining the first challenge, I am initially going to assume that all threats to stability are rooted in regulated banks.

The benchmark prudential instruments are capital, liquidity and collateral requirements. The parameters of that base regulatory framework are, if only implicitly, determined by two judgements: the degree of system resilience desired, and an assessment of the riskiness of the world. One can think of these as, respectively, a normative confidence interval for systemic distress, i.e. a maximum acceptable probability of a crisis, together with a set of empirically based assumptions about the underlying stochastic process generating those systemic threats.

To contain the costs of boom and bust, the benchmark *macro*prudential instruments are the capacity to *vary* those capital, liquidity and collateral requirements in the light of evolving threats to stability. In an important sense, this is *not* about changing the regulatory goalposts. Rather, it is about dynamically recalibrating, as needed, to

1 Blunden had by then retired as chair of the Basel Committee but was deputy governor of the Bank of England.

maintain a broadly unchanged degree of resilience in the system. Whereas the degree of resilience desired by a country should be broadly stable over time, the risk environment is not stable. So the regulatory parameters sometimes need to be adjusted as conditions evolve.

This is broadly analogous to the operation of monetary policy. In order to keep the path of aggregate demand broadly in line with the economy's productive capacity, the central bank changes its policy rate of interest in a way designed to keep the short-term real rate of interest (r) in line with the underlying equilibrium rate of interest that would maintain the economy in balance if prices and wages were flexible (r*). Thus, in the face of shocks to the economy, the policy rate might need to change in order to leave aggregate demand broadly in line with aggregate supply after a lag.

Something like that characterises the dynamic dimension of macroprudential policy. For the purposes of exposition, one can think of the risk environment – the underlying stochastic process – as moving between three broad modes: normal, exuberant and depressed. If the regulatory regime were permanently calibrated to 'exuberant', there would be a risk of the supply of financial services being impaired. If, however, it is calibrated to 'normal', the regulatory regime will not deliver the desired degree of resilience during 'exuberant' phases of the risk cycle. Thus, since an exuberant boom in credit and asset markets might temporarily alter the riskiness of the world (change the underlying stochastic process), some of the regime's parameters have to be dynamically adjusted. For example, capital (K) requirements (or minimum collateral requirements) might need to be increased temporarily in order to maintain system resilience in line with an *unchanged* degree of resilience desired by society.

In summary notation, if monetary policy is trying to keep r in line with r*, macroprudential policy is trying to keep, in this case, K in line with K*, defined as the capital level expected to deliver the desired degree of system resilience.

In other words, build up an extra buffer during periods of stability-threatening exuberance because, on a forward-looking basis, the resilience of the system would

otherwise be eroded. When the 'bubble' bursts, a debt-overhang amongst households and firms would still impede the subsequent macroeconomic recovery, but the downturn would be less severe if banking (broadly defined) did not collapse.

This way of viewing things has implications for the design of a macroprudential regime. First, it is consistent with framing the goal of macroprudential policy as maintaining the capacity of the financial system to deliver core services across the credit cycle. In other words, in their dynamic dimension macroprudential regimes are part of *inter-temporal stabilisation policy.*

As such, that points, second, to responsibility for macroprudential policy being delegated to an independent agency. That is because, as with monetary policy, a political decision-maker would be tempted to substitute their own interests (re-election) for the country's interests, allowing a potentially destabilising asset bubble or credit boom to persist in order to harness the 'feel-good factor'.[2]

A shape-shifting industry: Rules versus discretion

The assumption that only regulated banks matter to stability is manifestly false. But once other sectors and capital markets are brought within scope, the other challenge facing macroprudential policy looms large.

Legislators have typically favoured rules-based regulation. That is for good reason: it helps to guard against the exercise of arbitrary power by unelected officials. But a static rulebook is the meat and drink of regulatory arbitrage, which is endemic in finance. Finance is a 'shape-shifter'.

That makes it hard to frame a regime that keeps risk-taking in the system as a whole within tolerable bounds. Instead, excessive risk-taking is likely to migrate to less

2 There is not enough work on time-consistency and political-preference problems in macroprudential policy. Something as pared down as the Barro-Gordon model of price-stability credibility is needed.

regulated or unregulated parts of the system. Thus, with the re-regulation of *de jure* banks currently underway, some of the economic substance of banking will, again, inevitably re-emerge elsewhere. For example, anybody holding low-risk securities can, in principle, build themselves a shadow bank by lending out their securities for cash and investing the proceeds in a riskier credit portfolio.

Up to a point, that can be addressed through the regulation of institutions. If, to pluck an example from the air, an insurance company reinvents itself as a *de facto* banking and derivatives business, it could in principle be subjected to banking-like regulation of liquidity and leverage risk.[3] But banking-like fragility can also be generated through Russian doll-like chains of transactions or structures, via which *aggregate* leverage and/or liquidity mismatches *gradually* accumulate, and which don't involve a single financial firm which could be re-labelled and regulated as a bank. In the run up to the 2007 crisis, conduits funded by short-term paper invested in tranches of securitisations themselves invested in securitised paper. The possible examples are legion.

This shape-shifting dynamic can leave policymakers in a game of catch-up, responding only as each metamorphosis becomes systemically significant. Unless they are empowered to respond flexibly, it is a game they are doomed to lose. By the time the products of regulatory arbitrage are *evidently* systemically significant, those in the driving street will likely have the lobbying power to delay or derail reform. The powerful forces mobilised to oppose reform of the globally significant US money market fund industry illustrate that in capital letters.

A number of implications for the design of macroprudential regimes flow from these features of the financial world. First, it will not be sufficient for bank regulation to be dynamically adjusted. It will also be necessary, for example, to vary minimum collateral (margin, haircut) requirements in derivatives and money markets when a cyclical upswing is morphing into exuberance; to tighten the regime applying to a corner of

3 A subsidiary of AIG is reported to have done just that in the run up to the 2007-08 part of the crisis.

finance that is shifting from systemic irrelevance to a systemic threat; and to tighten the substantive standards, not only the disclosure standards, applying to the issuance of securities when the pattern of aggregate issuance is driving or facilitating excessive borrowing by firms or households.

That means, second, that if finance remains free to innovate, adapt and reshape itself, every kind of financial regulator must be in the business of preserving stability. That needs to be incorporated into their statutory mandates and, more generally, into the design of regulatory agencies.

The need for macroprudential policy can, therefore, seem threatening to existing agencies that thrived in an apparently simpler world.

Challenges for securities regulators

In particular, what I have been describing seems a long way from securities regulation as traditionally conceived. The mission of the US Securities and Exchange Commission is "to protect investors; maintain fair, orderly, and efficient markets; and facilitate capital formation" (SEC 2013). In the UK, the statutory objectives of the new Financial Conduct Authority are "to secure an appropriate degree of protection for consumers; to protect and enhance the integrity of the UK financial system; to promote effective competition in the interests of consumers".[4]

The central tenet of policy to achieve those objectives has for decades been disclosure enforcement (see, for example, Khademian 1992). Issuers of securities are expected to disclose all information materially relevant to investors; and pre-trade and post-trade transparency is required to make secondary markets fair. To varying degrees, securities regulators also approve, override or substitute for the rules of exchanges and market

4 The "integrity" objective is elaborated in the statute in a way that gives a hook for financial stability. The old Financial Services Authority paraphrased its statutory objectives as: "Market confidence; public awareness; consumer protection; reduction of financial crime".

bodies. Often that role entails balancing the varying interests of different groups of participants in the capital markets, such as corporate issuers, small intermediaries, big intermediaries, fund managers, and so on.

The latest crisis alters that picture fundamentally. Whether as regulator of securities issuance and distribution, of the terms on which derivatives are traded or of the structure of financial markets, of clearing houses, of trade repositories, or of 'shadow banks' (and I could go on), securities and derivatives market regulators are going to be in the front line in preserving stability.[5]

That entails more than disclosure enforcement and more than playing umpire amongst different sectional interests. Precisely because the problem of financial stability is about spillovers (or negative externalities) from private sector behaviour, industry input, however diverse, is unlikely to capture the social costs of distress. And because the costs are broadly spread across society as a whole and because the issues are so technical, public input during peacetime, before it is too late, is either unlikely, relatively ill-informed or both. Regulatory policy in the pursuit of stability entails making (and openly debating) judgements about the public interest.

But are securities regulators empowered to deliver this? It is not at all clear that the 'protection of investors' is sufficient to capture the public interest in systemic stability. A few years ago, the International Organization of Securities Commissions (IOSCO) amended its high-level Principles to add a new provision that securities-regulator mandates should include stability as an objective.[6] Implementation is, shall we say,

5 For my views while in office on the importance of securities regulation to stability, see Tucker (2011).

6 IOSCO Principles 6 and 7 were added in 2010. They are, respectively, "[t]he Regulator should have or contribute to a process to monitor, mitigate and manage systemic risk, appropriate to its mandate" and "[t]he Regulator should have or contribute to a process to review the perimeter of regulation regularly". An exercise for the reader is to spot the loopholes.

patchy.[7] There is a shift in the mission society needs without a legislative reform of mandates and objectives.

Implications for central banks

While the regime for regulation of non-bank finance needs reform, it should not be thought that central banks remain free to carry on as before.

First, whether or not they are prudential supervisors, they have been forcibly returned to their roots: financial-system stability matters and, as lenders of last resort, they will invariably be at the scene of the disaster. That is being re-programmed into their DNA.

Second, no one now thinks that monetary policy can always rapidly return an economy to health after a big financial crisis. Even with all the policy innovations of the past few years, the zero lower bound on nominal interest rates is a material constraint (Farhi and Werning 2013). Central bankers therefore have a big interest in societies embracing pre-emptive policies to preserve financial stability.

Further, I am with those who believe that monetary policy will rarely be the best pre-emptive instrument. That is somewhat at odds with a view that monetary policy has the virtue of "getting into all the cracks" (Stein 2013), but I think that that could hold robustly only in an economy with capital controls. In an open economy, domestic monetary policy does *not* penetrate all risk-taking channels and institutions. Risky projects can be financed in foreign currency from abroad; that's one reason the cross-border carry trade is so important. I fear that nothing – not monetary policy, not national regulatory policy – is sure to get into all the cracks. So the priority must be to make the

7 Interestingly, the preamble to the SEC's key governing legislation motivates the need for the agency very broadly, including the need for a more effective national banking system and Federal Reserve System, and the risk of sudden and unreasonable fluctuations in the prices of securities causing alternately unreasonable expansion and unreasonable contraction of the volume of credit supplied to the economy. That captures a good deal of modern thinking about why financial stability matters but it is not fleshed out in the body of the legislation. As SEC Commissioner Dan Gallagher has emphatically said, "…systemic risk reduction is not part of the SEC's mandate…".

(shape-shifting) core of the system resilient, and for jurisdictions to actively cooperate in that.

This is not to deny that monetary conditions can affect risk-taking behaviour – I am confident that persistently loose monetary policy can sometimes fuel a search for yield (Tucker 2012, Hanson and Stein 2012). The policy question is the order in which instruments should be deployed to help preserve stability. I believe macroprudential policy should be the first mover because it can act directly on the resilience of the financial system. That means that the dynamic dimension of macroprudential policy needs to take account of monetary conditions, and vice versa.

Third, it follows from this that there are implications for the design of the central bank whether or not it is the macroprudential policymaker. If it is not, the central bank has to accept that another body will be affecting credit conditions; cooperation is vital. If it *is* the macroprudential policymaker, that set of responsibilities needs to be framed separately from monetary policy so that accountability for the two sets of objectives and instruments is clear.

Conclusions: Framing a macroprudential regime

I shall conclude with three additional broad principles for the design of macroprudential regimes.

First, we need politicians to decide on, and be held accountable via the ballot box for, the degree of resilience required of the financial system. In other words, it should be a regime of 'instrument independence' not 'goal independence' for the independent agency (or agencies) charged with its delivery. Expert officials can help (and have helped) to frame public debate on how much resilience is warranted, but the degree of protection society wants is not for unelected officials to determine on their own.

Second, a macroprudential regime should endow an independent agency (or agencies) with a remit and powers *only* to safeguard stability. That is not about fine-tuning the

credit cycle. And it does not extend to intervening (*qua* macroprudential authority) in those market malfunctions, including some asset-price booms that impair the efficient allocation of resources in the economy but do not materially threaten stability itself. Of course, in practice those distinctions involve difficult judgements, but the power of independent agencies needs to stop somewhere if they are to enjoy substantive legitimacy (as opposed to solely the procedural legitimacy conferred by a legislative act). This is a field where some boundaries are needed.

Third, societies need to choose between two broad models for the agency structure of macroprudential regimes. One would have a distinct macroprudential regulatory body, which was empowered to override the decisions of individual prudential or market regulators where necessary to preserve stability. The other would leave macroprudential policies in the hands of separate micro-regulators, subject to a mechanism for coordination across agencies. But under either model, each micro-regulatory agency must have a statutory responsibility for preserving stability, for which they are accountable to the legislative assembly. And, I would suggest, a hierarchy of statutory objectives is warranted, with stability coming first.

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Macroprudential policy: The neglected sectors[1]

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The objective of macroprudential regulation is to reduce the risk and economic costs of financial instability. To date, most attention has been paid to the banking sector. This chapter focuses on insurance and funded pensions to discuss the feedback mechanisms and trade-offs embedded in macroprudential policies. Given their importance for financial stability, the macroprudential policy framework needs to assess the effect of prudential rules for insurers and pensions on aggregate spending (GDP).

Introduction

With the introduction of the banking union, bank supervision has moved to the Eurozone level. At the same time, and as a response to the credit crisis, macroprudential policy has been vested, EU-wide, with the local national authorities. Macroprudential policy and supervisory activity, overseeing the financial sector as a whole, are novel activities for which the framework is still developing. The objective of macroprudential regulation can be described as to reduce the risk and the macroeconomic costs of financial instability. It is recognised as a necessary ingredient to fill the gap between macroeconomic policy and the traditional microprudential regulation of financial institutions (see Bank of England 2009). Its policy operations are described as "the activity which identifies, monitors, and takes action to remove or reduce risks that threaten the resilience of the

1 This article is dedicated to our late colleague Professor Guus Boender, founder of the quantitative approach to pension asset liability management in the Netherlands. It is written in the spirit of our earlier joint work.

UK financial system as a whole" (Tucker et al. 2013). In general, three intermediary aims support this objective: managing systemic risk, limiting business cycle volatility, and implementing structural (market and government) reforms to support resilience in the longer term.

In the UK, macroprudential supervision is vested within the central bank in a separate supervisory unit: the Financial Policy Committee (FPC). The FPC is thus at arms' length from the government and separate from the microprudential supervisor and the body that oversees financial market conduct. The FPC has the power to give recommendations and directions to the Prudential Agency (PRA) and the Financial Conduct Authority (FCA). Within the EU, the UK framework is just one of the ways in which macroprudential policy is organised. The proper institutional design of the macroprudential framework is an important issue, which must follow from the questions and issues that it addresses. In this chapter, we consider the feedback loops that exist among the different financial sectors and between financial sectors and macroeconomic policy, from which we derive some implications for the institutional design.

To date, most attention has been given to the banking sector. We focus on the neglected sectors of insurance and fully funded pensions. While these sectors are less susceptible to runs in the classic sense, their sheer balance sheets are large. Macroprudential policy decisions, whether implicit or explicit, therefore sort first order effects on the macroeconomy and vice versa. Moreover, banking sector policy measures have important spillovers on the other two financial sectors. Financial crises also have a major impact on the capital of the other two sectors and thus affect the macroeconomy at large in the feedback loop. This effect is enhanced through current accounting standards (e.g. IFRS13), which require the two types of neglected financial entities to value their liabilities by using a market-based yield curve, in contrast to the banking book, which is based on historical book values.

This chapter discusses these macroeconomic feedback mechanisms and trade-offs embedded in macroprudential policies. Rudimentary data analysis serves as

an illustration of both issues. Subsequently, we suggest what this implies for the institutional design of the macroprudential policy framework.

Macro mechanisms

Trade-offs

Macroprudential policy deals with several trade-offs. Suppose, for example, that the ECB lowers its interest rates to bring down the funding costs of commercial banks and enhance the provision of credit in the economy (via the banking channel). This also deteriorates the balance sheets of long term lenders like pension funds and life insurers (Boender et al., 2010). Pension funds and insurers are regulated by the Solvency Directive, which stipulates that liabilities have to be valued based on market prices. This is in contrast to the banking book, which is valued on historical cost accounting. Thus, a decrease in interest rates directly impacts the balance sheets of insurers and pension funds, as it raises their liabilities. The banking book, on the other hand, is unaffected. In countries like the Netherlands and the UK with sizeable funded pensions, anything that affects pension funds' liabilities has macro consequences.

Another example is the introduction of the Ultimate Forward Rate (UFR) for liability calculations. From 2015 onwards, the Dutch supervisor will use the higher (EIOPA) UFR for insurers and a lower (national) UFR for pension funds. This influences the solvency capital of both types of pension providers differently, thus making the playing field uneven. Given that pension promises are meant to provide less security than life insurance policies, this uneven handling of the liabilities appears misplaced. The UFR of pension plans should rather be above the UFR of insurers since pensions are more risky. In a market-based approach, however, it would seem that there only exists a single yield curve. After discounting based on this curve, different risk premia might be applied for different type of products (in line with the risk characteristics of the products).

The above examples indicate that policy actions either implicitly or explicitly determine which sector benefits from monetary or supervisory measures, and which sectors suffer. Moreover, sensible microprudential decisions can have unintended positive or negative effects on aggregate demand. After all, the difference between macroprudential and microprudential policy is "*that macroprudential supervisors take account of the collective behavior of institutions and of second-round effects, while microprudential supervisors take these risks as given since they are independent of the behaviour of an individual institution*" (Houben 2013: 206). Often such prioritisation is done implicitly and can only be observed ex post. There may be good reasons for not disclosing this ex ante, such as timing issues. However, the supervisor could provide more clarity on their assessment of the macroeconomic situation and sectoral implications. At least an explicit framework within which the trade-offs are evaluated is called for.

Feedback

The macroeconomic feedback mechanisms refer to both interactions between sectors, and the impact of budgetary measures on the financial industry and vice versa. A point in case is the bailout of banks and ailing Eurozone governments. These bailouts increased the budget deficits of the governments that provided the bailouts. In response, governments invoked strict budgetary policies. The ensuing austerity depressed aggregate demand.

Another example is the regulatory measure to demand stronger capitalisation of pension funds in the Netherlands, which also depressed aggregate demand and the ability to recover from the Credit and Eurozone Crises. These measures were taken as a result of the Dotcom Crisis (2003) and the Eurozone Crisis (2008). In the latter crisis, the flight to quality from the south to the north depressed northern interest rates and hence increased the liabilities of pension funds and insurers. One might ask whether such a flight to quality warranted an immediate increase in premiums and lower benefits for long-term investors like pension funds. Were the future markets correctly pricing in no

return to normal in the foreseeable future, or was this a case in which the extraordinary macro situation had to be judged as being of temporary nature only?

Empirical illustration

Prior to entry into the monetary union, the yields of long-term bonds in prospective Eurozone countries converged upon the Bund yield. This happened under the presumption that the single monetary policy also meant a solid inflation target and accompanying strict budgetary policies in the member countries. Moreover, in the first years after European unification the long-term yields in the Eurozone were driven downward by a trend, which set in after the stagflation era of the 1970s and early 1980s. Even after the first Greek bailout in May 2010, the illusion of a single Eurozone yield curve persisted. The decision of Merkel and Sarkozy that the private sector had to contribute to the Greek bailout, which was against the explicit recommendations of the ECB, shattered this view. The Eurozone Crisis was born as countries like Italy experienced a rapidly increasing spread over the few bonds in the Eurozone with an AAA rating (see Figure 1). The partial Greek default signalled that, due to the lack of a mutual support mechanism, the risk premiums of countries had to be assessed separately in the Eurozone. In Figure 1, this divergence shows as the deviation between the yields on the Dutch and Italian ten-year government bonds. The bars in the figure provide a short history of the Eurozone Crisis. Only after the pledge of 'whatever it takes' by the president of the ECB in 2012, and the start of the banking union in 2014, did interest rate spreads converge again to acceptable levels.

Figure 1 Yields on the Dutch and Italian ten-year government bonds, 2007-14

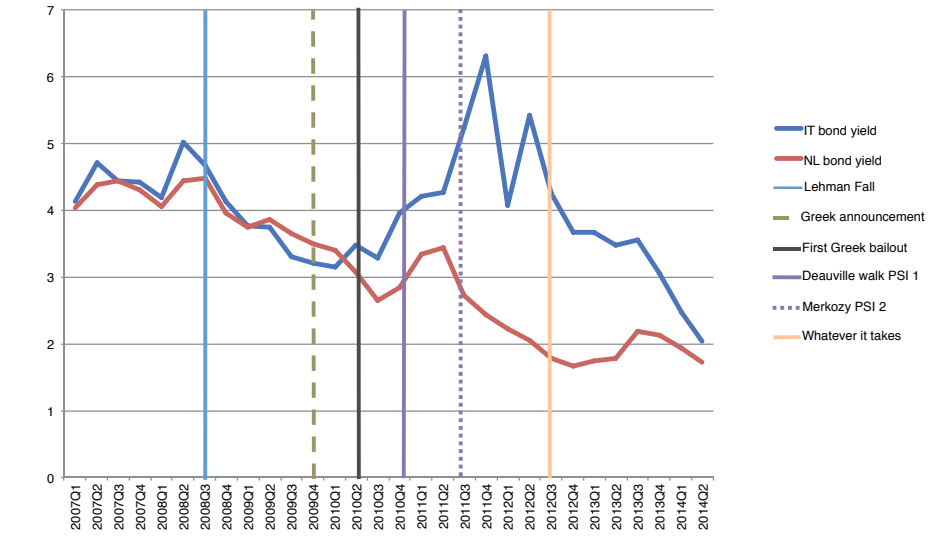
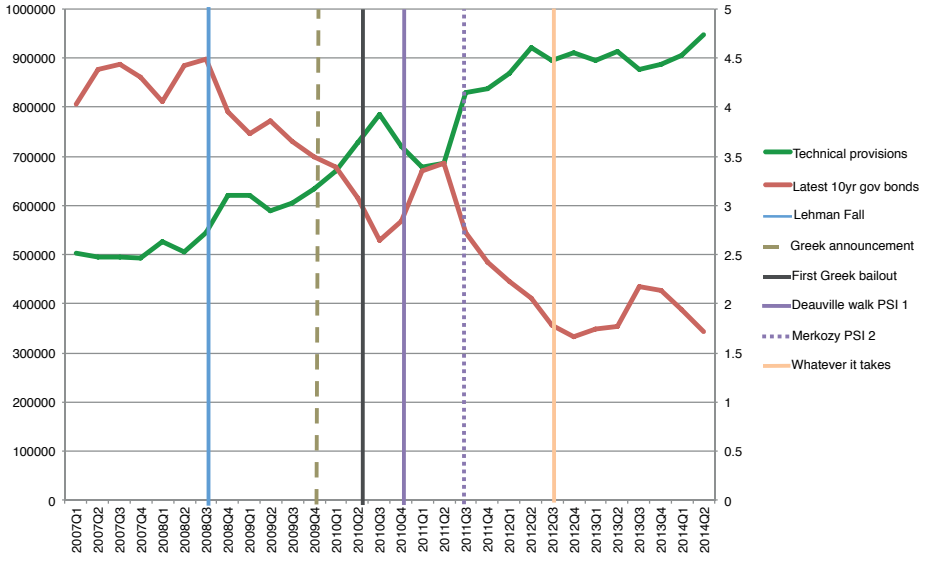


Figure 2 Dutch ten-year yield and technical provisions of pension funds



In the Netherlands the yield curve is used to discount the liabilities of pension funds. An upward shift or steepening in the yield curve reduces future liabilities. Figure 2 depicts the evolution of the liabilities of the Dutch pension funds throughout the Credit Crisis and the subsequent Eurozone Crisis. The liabilities are measured by the technical provisions of pension funds,[2] and shown on the left-hand scale. Furthermore, Figure 2 shows the evolution of the yield on ten-year Dutch government bonds (right-hand scale). The paths followed by the technical provisions and ten-year bond yield appear to mirror each other.

From Figure 2 it appears that the liabilities of pension funds as measured by technical provisions are driven by the interest rate. This effect may be caused by the discounting method applied, which employs the market-based yield curve. Other determinants of pension funds' liabilities are the number of retirees, accrual rates, and indexation ambitions. The extent of pension funds' liabilities is perhaps also partly responsible for the decline in long-term yields. A fall in the interest rate increases the liabilities of pension funds through a decrease in the discount rate. Consequently, this requires funds to further expand their interest rate hedging activities. During the most recent crisis, pension funds bought interest rate receiver swaps to hedge against further adverse declines in the yields. Regardless of whether these hedging activities are implemented through buying bonds or the purchase of swaps, they exert a downward pressure on the interest rates. The higher liabilities imply an increase in contributions or a restriction of benefit pay-outs, which both lead to a fall in aggregate demand. During a crisis, this fall in demand unnecessarily aggravates the cycle. Below, we investigate the evidence for such vicious feedback mechanisms between interest rates and liabilities. From the figure, the direction(s) of influence cannot be easily disentangled.

2 These numbers exclude insured collective pension plans and plan members' own investments

Empirical exploration of a macro feedback loop

We investigate the feedback loop between technical provisions of Dutch pension funds and the ten-year Dutch government bond yield through a regression analysis. The Dutch pension system consists of three pillars: a basic pay-as-you-go state pension for all citizens; an essentially fully funded, collective, occupational second pillar; and an individual, voluntary third pillar. The second pillar contains defined benefit and defined contribution schemes, as well as intermediary and hybrid plans. The assets under management in the second pillar amount to approximately twice the GDP of the Netherlands. The Dutch pension system ranks highly in international league tables.

Methodology and results

To study the feedback loops between interest rates and liabilities, we estimate a bivariate system in which both variables are endogenous. The data consists of quarterly observations over the period 2007-14. The introduction of a new supervisory and regulatory framework for Dutch pension fund supervision in 2007 provides a natural starting point for estimation of the feedback loops. Changes in liabilities, as measured through the changes in technical provisions (ΔT), are assumed to be a linear function of the quarter to quarter changes in the ten-year Dutch government bond yield (ΔY) and the changes in the percentage of assets that the funds hold in government bonds, (ΔB). Presumably the increases in technical provisions are at least partly driven by the increasing value of the bond portfolio and interest rate swap portfolio as yields decline. The proportion of government bonds in pension funds' portfolios is thus included in the regression as an explanatory variable to control for this effect. The yield variable then measures the extra effect of a movement of the interest rate on the hedging activities of the funds. As mentioned previously, regulatory standards coerce funds into extra interest rate hedging activities when interest rates move down. Both variables have the expected sign, but the interest rate is only marginally significant. The lagged yield changes ($\Delta Y(-1)$ and $\Delta Y(-4)$), changes in the Italian yield (ΔI) and changes in current

and lagged total assets (ΔA and ΔA(-1) respectively) were used as instruments. Note that Dutch pension funds typically hold about 30% in equities and the like.

In the second regression the changes in the ten-year Dutch yield are explained by the changes in the Italian ten-year yield, the changes in technical provisions and the lagged Dutch ten-year yield using the same set of instruments as before (see Table 1, part 2). The second regression shows that technical provisions have a strong negative effect on the ten-year yield. Therefore, there appears to exist a significant two-way feedback between the technical provisions and the long-term interest rate, with a stronger effect from the former on the latter.

Table 1 Simultaneous equations

Simultaneous equation 1

Dependent variable: ΔT				
Variable	Coefficient	Std. error	T-statistic	P-value
C	2.014	5.081	0.396	0.694
ΔB	1435.082	424.602	3.380	0.002
ΔY	-55.757	31.163	-1.789	0.081
Adj. R^2	0.722			
Durbin Watson	2.342			
Instruments: ΔA, ΔA(-1), ΔB, ΔI, ΔY(-1) and ΔY(-4)				

Simultaneous equation 2

Dependent variable: ΔY				
Variable	Coefficient	Std. error	T-statistic	P-value
C	0.065	0.033	1.971	0.055
ΔI	0.085	0.036	2.344	0.024
ΔT	-0.006	0.001	-7.635	0.000
ΔY(-1)	0.382	0.097	3.921	0.000
ΔY(-4)	0.196	0.096	2.040	0.048
Adj. R^2	0.798			
Durbin Watson	2.330			
Instruments: ΔA, ΔA(-1), ΔB, ΔI, ΔY(-1) and ΔY(-4)				

Notes: A: Total invested assets of pension funds; B: Percentage of assets of pension funds invested in government bonds; C: Constant; I: Yield on Italian government bonds; T: Technical provisions; Y: Yield on the latest ten-year Dutch government bonds.

Policy implications

This two-way feedback has implications for the supervisor of pension funds, the monetary authorities and for fiscal policy. Expansive budgetary policies, for example, leading to higher debt and higher interest rates, would lower the apparent liabilities of a fund. Budgetary policy by itself might increase the asset allocations of pension funds and the pension benefits, thus feeding into the expansionary cycle. Proper countercyclical macroprudential policy would probably curtail such a pay-out policy.

As another example, consider what happened during the credit and Eurozone Crises. The flight to quality to the very limited amounts of AAA-rated government bonds severely depressed yields and increased technical provisions to such an extent that pension funds appeared underfunded. It triggered lower distributions and higher contributions, which depressed aggregate demand. For good reason, Dutch pension funds were given an extension in their recuperation plans and the supervisor smoothed the effect of daily market-based valuation by averaging the interest yield curve used for discounting over three months.

In summary, this exploration of macro feedback loops reveals the importance of developing a coherent and explicit framework within which these effects can be analysed and evaluated. Moreover, it shows the need for a clearly structured institutional setup, which is discussed in the next section.

Institutional setup

Prudential supervision used to be completely micro oriented, i.e. on an individual institution basis. A benefit of the credit and Eurozone Crises is that the systemic effects and macro implications of micro supervision and sectoral interactions are again placed squarely on the policy table (Houben 2013: Annexes 1 and 2). These effects and implications include the macro feedback loops that emerge from microprudential supervision, as well as the trade-offs that monetary and supervisory policy measures

may invoke across sectors. The existence of unnecessarily harmful or overly positive feedback loops is evident from the above analysis. In the EU the need for a macroprudential policy framework became apparent as a result of the Eurozone Crisis. Its development is an ongoing process. Given the need for such a policy framework, the task is to design a proper institutional setup and allocate appropriate policy goals and policy tools. We focus on the institutional setup. It is clear, however, that the debate on appropriate (and explicit) policy tools is of equal importance.

Macroprudential policy finds itself in between traditional macro policies, such as monetary and fiscal policies, and microprudential supervisory policy. Over time it has become clear that monetary and microprudential supervision are best placed in the hands of institutions that are at arm's length from the government, while fiscal policy is the prerogative of the government and parliament. Given the ambiguity surrounding macroprudential policy, its optimal position is unclear. On the one hand, the standard arguments suggest positioning macroprudential policy at arm's length distance from the government. If this route is chosen, it still has to be decided whether to position it, for instance alongside microprudential policy inside the same institution (often a national central bank), or above the microprudential and conduct authorities, and separate from the other supervisors. On the other hand, macroprudential supervision also touches upon the cyclical and structural macro prerogatives of the government. This notion, which would support vesting the authority inside the government, would not be novel. For example, in pay-as-you-go pension systems, the pension policy is firmly in the hands of the government. Decisions on contribution levels and benefits in capital-based systems, however, have comparable effects on aggregate demand as in the tax-based pension systems. This provides an argument to vest certain parts of macroprudential policy explicitly with the government, being the executive branch. Given the novelty of macroprudential policy, the EU has chosen to experiment. In its directive on macroprudential policy, the EU requires each country to develop a framework for such policy. Aside from this requirement, countries are quite free to decide how to design, organise and interpret this framework. We discuss the example of the UK framework.

In the UK, the Financial Policy Committee (FPC) sits on top of the Prudential Authority (PRA) and the Financial Conduct Authority (FCA). The FPC focuses on macroprudential policy, while the PRA focuses on microprudential policy. The FPC is placed above the other two supervisors but, somewhat surprisingly, is still vested inside the central bank. The FPC can issue recommendations and directives concerning sectoral capital requirements and countercyclical buffers. Given that macroprudential policy has overarching effects concerning individual institutions, as was suggested by the above analysis, it is clearly desirable that macroprudential policy takes precedent over microprudential policy, in the sense that it should be able to give directions to the micro supervisors and not the other way round. In other countries, this division of powers is less clear. In the Netherlands, for example, macroprudential policy regarding pension funds is in the hands of the Ministry of Social Affairs. Setting bank capital requirements and counter-cyclical buffers, however, is delegated to the central bank. The Dutch situation therefore is an amalgam with a less transparent division of powers.

In the long run it appears to be desirable to move certain parts of macroprudential policy to the EU or at least the Eurozone level. This point can be illustrated by considering the different run of events on two continents. The US economy recovered relatively quickly from the credit crisis due to a law that forced almost all US banks to acquire more capital. This approach even succeeded in the midst of the crisis. The patchwork EU policy framework, however, was unable to enforce such a forceful fix. As a result, many of the banks are still suffering from debt overhang, like the Japanese zombie banks, and credit is difficult to come by.

This example shows that some parts of the macroprudential policy framework belong to the supra-national Eurozone or EU level. Although the newly erected European Systemic Risk Board (ESRB) can issue recommendations, it is otherwise powerless. This is one reason for why the banking union is only partly complete and requires further development. Unilateral decisions, such as the Irish overnight decision to raise deposit insurance to avert a bank run, had large negative externalities on the other banks

in the Eurozone. The resulting externality costs may even have surpassed the cost of an immediate restructuring of the Irish banks.

Conclusion

Macroprudential policy operates in an evolving framework. In this chapter, we have emphasised the two aspects of trade-offs and feedbacks that come with this policy framework. At present, the framework is farthest developed for the banking sector. This creates an uneven balance with the two other financial sectors. Funded pension funds and insurers are important long-term investors in the economy and are accordingly of importance for the financial stability of a country. The macroprudential policy framework needs to make explicit the interactions between these sectors and the trade-offs that exist in taking macroprudential policy decisions. The positioning of the macroprudential policy body and the discretionary power on the appropriate tools follow as a logical consequence.

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Part III

Instruments

Capital regulation and credit fluctuations

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The objectives assigned by regulators to countercyclical capital requirements are very vague. In this chapter, the authors show that these capital requirements are the appropriate instrument for stabilising credit cycles, and that they would indeed increase social welfare. Moreover, such an objective is much easier to monitor, which would improve the regulators' accountability.

The newly established macroprudential regulators have started considering the implementation of *countercyclical capital ratios*, i.e. imposing tighter capital requirements in booms. Yet, the conceptual foundations for such a regulation are not entirely clear.

On the one hand, regulators wish to encourage banks to "build up buffers in good times that can be drawn down in bad ones" (Drehmann et al. 2010). This argument might be problematic. If bank capital is viewed as a "buffer" against future losses, it should not be raised during booms but during recessions, when loan losses are larger. In a dynamic perspective, if macroeconomic shocks are negatively correlated, it is wise to anticipate that good days are likely to be followed by bad days, of course. But then, the appropriate policy is not to adjust minimum capital ratios. It should rather be to redefine risk weights and adopt an accurate measure of credit risks – through the entire cycle and not only at one point in time, as we discuss below.

Another possible justification for countercyclical buffers is that "risks build up during good times" (Drehmann et al. 2010). The underlying idea is that banks relax their credit

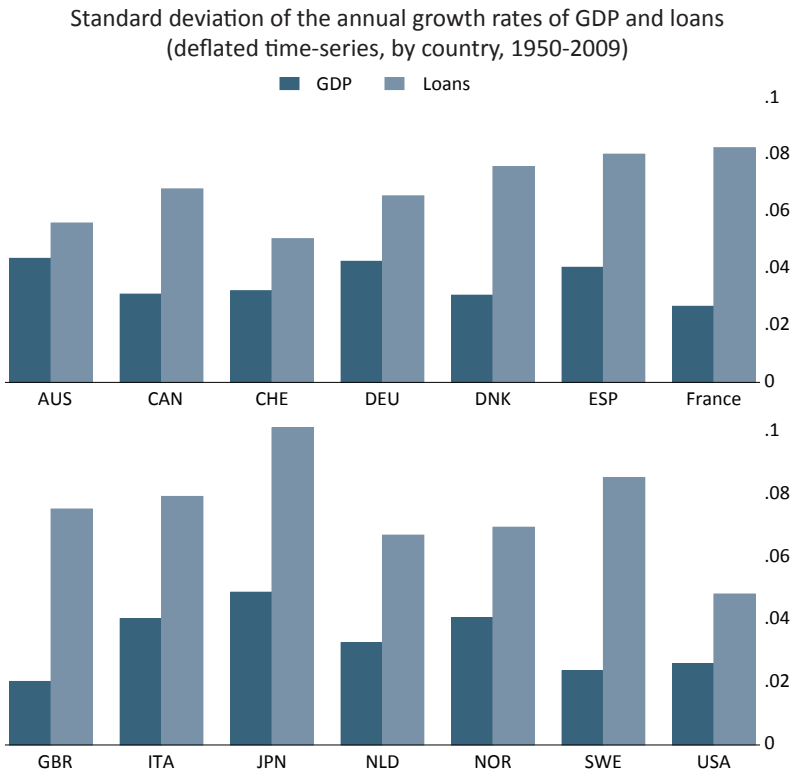
standards during booms, either because of irrational exuberance à la Minski or because they anticipate to be bailed out, as explained in Fahri and Tirole (2012), and thus accumulate excessive risks in their loan portfolios, generating massive losses during downturns.

Stabilising credit cycles

We advocate a complementary, but much simpler, objective: to limit the banking system's tendency to amplify economic fluctuations. Our presumption is that *banks tend to lend too much during booms and too little during downturns*, generating excessive fluctuations of credit, output and asset prices. There is indeed considerable empirical evidence that credit fluctuates more than GDP in advanced countries. Figure 1 is based on the long-term dataset collected by Schularick and Taylor (2012). It compares the standard deviations of the annual growth rates of GDP (black) with bank credit (grey) for 14 advanced countries over the period 1950-2009. Although there are obvious differences across countries, credit is always more volatile than GDP.

This empirical finding does not necessarily imply any kind of market failure. However, in our recent paper (Gersbach and Rochet 2014), we perform a welfare analysis of credit fluctuations in a stylised general equilibrium model with banks and financial frictions. Banks alleviate these financial frictions by monitoring small and medium-sized enterprises that are unable to obtain direct finance on the corporate bond market. However, banks themselves are potentially subject to financial frictions and thus have only limited borrowing capacity. This capacity depends on endogenous variables such as banks' equity and interest rates on loans and bonds.

Figure 1 Credit fluctuations



We show that this endogenous determination of the leverage of banks generates welfare-decreasing pecuniary externalities, which parallels the findings of Lorenzoni (2008), Bianchi (2011) and Korinek (2012).[1] The mechanism behind this pecuniary externality is simple. Anticipating higher returns on assets during booms, the banks use hedging instruments to increase their lending capacity in booms. This enables them to lend more during booms without taking the impact of their decisions on asset prices

1 In these papers, the pecuniary externality is a consequence of the fluctuations of collateral prices. It is a better fit for the situation of small borrowers than for the banks' situation. Moreover, Krishnamurthy (2011) has shown that the externality disappears if these borrowers have access to hedging instruments, which is clearly the case for banks. In our setup, the externality is more direct and remains present even if banks can use financial derivatives to reallocate their borrowing capacity across the business cycle.

into account. Even if banks have no market power, they all have similar exposures to macroeconomic shocks and tend to make the same lending decisions. Collectively, banks have an impact on asset prices that is not internalised by the banks' shareholders. As a result, in the competitive equilibrium, asset prices are too high in good states and too low in bad states.

Our paper shows that this inefficiency can be corrected by imposing a (stricter) capital ratio[2] in good states. By reducing bank lending during booms, the regulator allows banks to free up borrowing capacity during recessions. Under very general conditions, we are able to show that in terms of output consequences, the increase in lending during bad times more than compensates for the reduction in lending during good times. The ensuing stabilisation of credit cycles is welfare-improving.

We also find that capital ratios for which the banks' equity is computed at a given date can be arbitraged away by banks. The only effective means to dampen credit cycles is to compute banks' capital over the entire cycle.

Thus we argue that credit cycles can be detrimental to welfare, even in the absence of banking crises. Our approach complements the literature on endogenous banking crises based on investors' irrationality (over-optimism à la Minsky) or on the expectation of future bailouts (Farhi and Tirole 2011). This weakens the argument sometimes put forward that bubbles are desirable because they stimulate growth. It appears to us that the welfare cost of credit crunches is probably much higher than the hypothetical welfare gain generated by credit booms.

2 This capital ratio complements the traditional microprudential ratio, which is meant to limit banks' excessive funding through insured retail deposits.

What mandate for macroprudential regulators?

For macroprudential regulation to be effective, regulatory authorities should be endowed with sufficient power and be protected from ex post political interference and industry lobbying. This is only possible if a clear mandate is given to these authorities and if their accountability is guaranteed by ex post control by the parliament and the media.

So far, the mandate given to these macroprudential authorities is expressed too vaguely. They are expected to "preserv[e] the resilience of the financial system", an activity that is hard to assess. In fact, the new legislations have essentially transposed the classical mandate of microprudential authorities – limiting the probability and cost of individual bank failures – to the financial system as a whole – i.e. limiting the probability and cost of systemic crises. Our claim is that such a mandate might well foster regulatory forbearance. Indeed, history has taught us that typically, banking authorities are reluctant to enforce corrective measures for banks in distress before it is too late. This risk is even stronger in the case of macroprudential policies, because they typically need the support of the Treasury and the ministry of finance. Indeed, in the event of excessive credit growth or risk build-ups, governments seem reluctant to use macroprudential tools such as countercyclical capital ratios and capital add-ons for SIFIs, for instance, especially if general elections are approaching. We believe that the activation of such tools has to be connected to simple, objective triggering indicators such as the credit growth or credit-to-GDP ratio.

Thus we propose to broaden the mandate of macroprudential authorities, from "limiting the probability and cost of systemic crises" to "stabilising credit cycles". This is a broader objective because systemic crises are just an extreme form of a credit cycle ("credit booms gone bust", as argued by Schularick and Taylor 2012). More importantly, the objective we suggest is much easier to monitor ex post by the parliament and the media. To explain this, a parallel with monetary policy is useful: no one could imagine a mandate as vague as "limiting the probability and cost of hyperinflation episodes" for a central bank. There would be no way to assess this objective and, in practice, the

central bank would be able to do as it pleased. Instead, most countries have adopted quantitative objectives such as a flexible target of 2% CPI inflation. This is only a pragmatic objective, since there is no universally accepted economic model showing that 2% corresponds to any kind of optimal inflation target. The costs and benefits of inflation are very difficult to assess. However the (now well-accepted) doctrine of flexible inflation targeting is grounded in the common-sense argument that high and volatile inflation rates are bad for an economy.

We suggest adopting a similarly pragmatic approach for the objectives, the instruments and the procedures of macroprudential policies. There appears to be a consensus that a high volatility of credit supply is costly for our economies. Although there is no universally accepted model of the optimal volatility of credit growth, a commitment from the macroprudential authorities to limiting excessive fluctuations of the credit-to-GDP ratio would promote long-term welfare in all likelihood. To achieve this goal, the activation of countercyclical regulatory tools depends on the judgement of the experts of a Financial Stability Committee, i.e. the counterpart of the Monetary Policy Committee. To guide such triggering, economists must develop a new class of macro models with a banking sector. These models should be simple enough to make the financial stability trade-offs accessible for public decision-makers, and sophisticated enough to reproduce the long-term impact of shocks to the banking sector on growth and social welfare.

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Understanding financial cycles

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The recent Crisis has shown that financial cycles are still poorly understood. This chapter explores their main features as well as what happens when financial cycles in different markets coincide. The findings indicate that cycles, especially those in the housing and credit markets, can be long and deep. They can also accentuate each other and become magnified. Policies that aim at stabilising the financial system – such as macroprudential regulations – should take this into consideration.

Research on the interactions between different types of cycles has produced a number of important policy lessons. Extensive studies of the linkages between inflation cycles and business cycles, for example, have allowed economists to warn of the risk of higher inflation if monetary policy is too lax and the economy is operating above its potential. The recent crisis has shown, however, that the linkages between financial and business cycles are still poorly understood.

The crisis has also led to a re-examination of some of the conventional policy lessons (Blanchard 2011). In particular, it has led to an extensive debate about how monetary policies should take into account financial outcomes (Cardarelli et al. 2008). And there is the ongoing discussion of whether financial deleveraging has advanced far enough (Buttiglione et al. 2014). These debates have emphasised not just the link between inflation and business cycles, but also the importance of improving our understanding

1 The views expressed in this column are those of the authors and do not necessarily represent the institutions they are affiliated with.

of financial cycles and their implications for the business cycle, notably for the recovery from a crisis.

Previous research on financial cycles has been based mostly on historical narratives rather than systematic analyses. Consequently, some fundamental questions have been left unanswered:

- What are the main features of cycles in financial markets?
- What happens when cycles in different financial markets coincide?

To answer these questions, we apply the traditional methods of business cycle analysis to characterise the cyclical properties of key financial variables in the advanced economies over the period 1960-2013.[2]

How can a financial cycle be defined?

Given that they constitute the core of financial activity, we concentrate on cycles in three distinct but interdependent market segments: credit, housing, and equities. In order to characterise financial cycles, we draw parallels between the phases of cyclical fluctuations in output, i.e. business cycles, and those in financial markets. We therefore call the recovery phase of a financial cycle the upturn and the contraction phase the downturn.

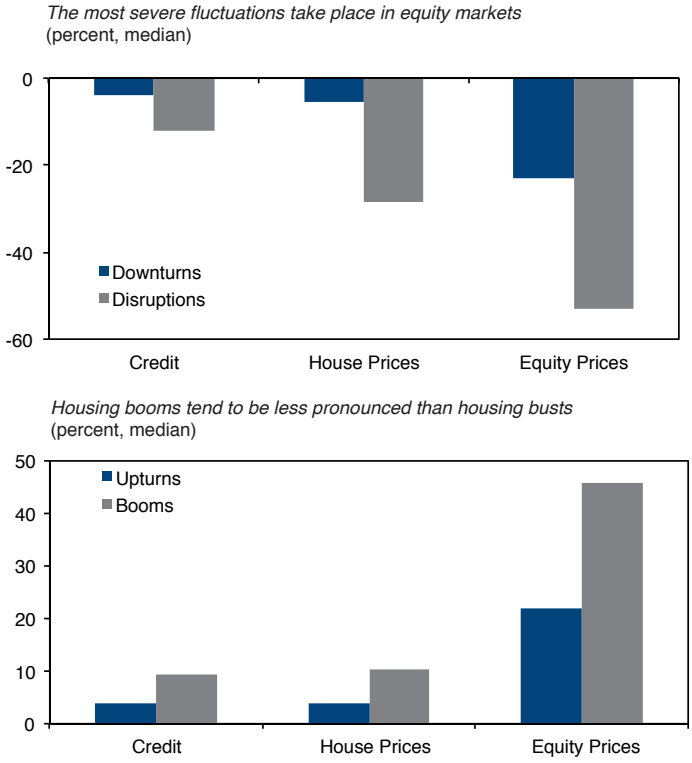
In addition to standard cycles, we examine the more intense forms of financial cycles – disruptions and booms – because large movements in financial variables are often associated with more volatile fluctuations in economic activity. Disruptions include credit crunches and busts in housing and equity markets, while booms analysed are in credit and asset prices.

2 The methodology and data up to 2007 are taken from Claessens et al. (2011); data presented here are updated to 2013.

What are the main features of financial cycles?

Financial cycles can be intense, as measured by the amplitude of, for example, the decline in real house and equity prices or real credit volume from peak to trough during downturns, or the change in each financial variable during the first four quarters of an upturn (Figure 1).

Figure 1 Financial cycles



Notes: The amplitude of downturns refers to the decline in each variable from its peak to trough. The amplitude of upturns is the change in each variable within the first four quarters after its trough. Disruptions (booms) correspond to the bottom (top) 25% of downturns (upturns) in terms of the amplitude. Downturns (upturns) refer to the episodes other than disruptions (booms).

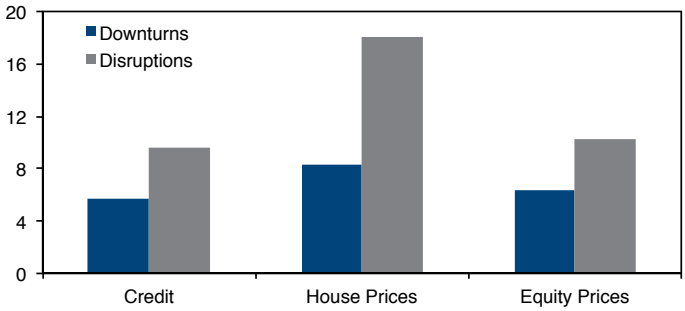
- Credit crunches, i.e. disruptions in credit markets, are about four times deeper than the average credit downturn, while house price busts are seven times bigger than the average house price downturn.

- In the case of housing markets, swings are typically more asymmetric across the two phases of the cycle: an increase of 10% during booms and a decline of almost 30% during busts.

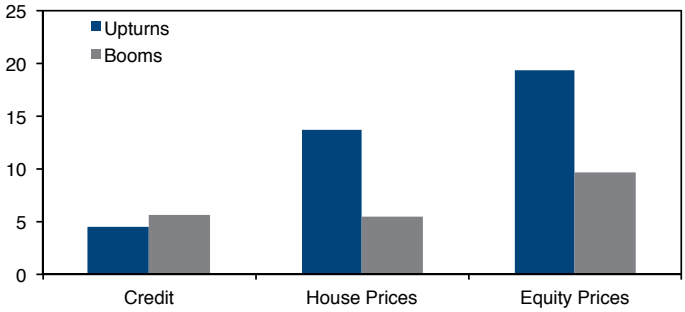
Moreover, disruptions are often much longer than normal financial downturns (Figure 2).

Figure 2 Disruptions tend to be longer, booms are often shorter…

On average, a house price bust lasts the longest
(quarters, average)



Upturns in equity markets are more persistent than others
(quarters, average)



Notes: Duration for downturns is the number of quarters between peak and trough. Duration for upturns is the time it takes to attain the level at the previous peak after the trough. All statistics are sample means. Disruptions (booms) correspond to the bottom (top) 25% of downturns (upturns) in terms of the amplitude. Downturns (upturns) refer to the episodes other than disruptions (booms).

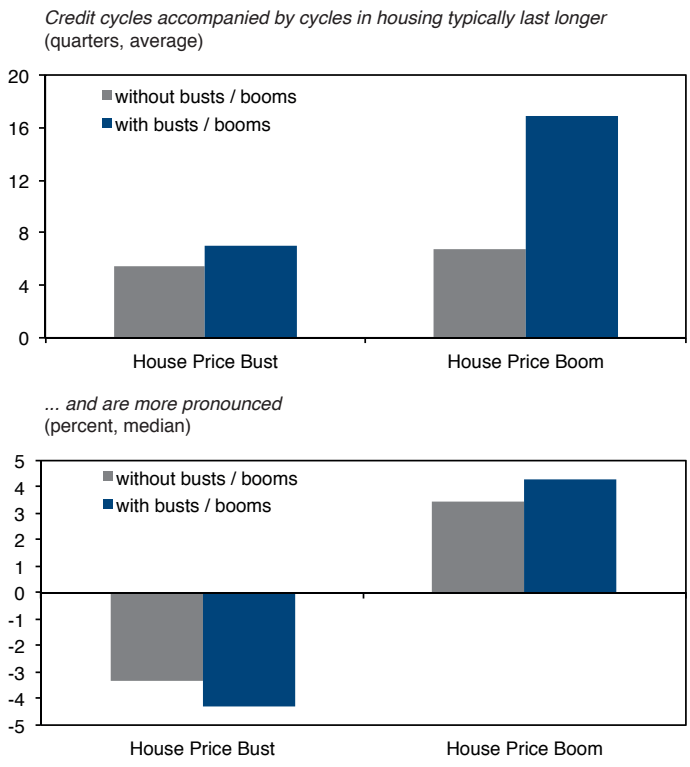
- The average duration of disruptions ranges between 10 and 18 quarters, with house price busts lasting the longest.

- In contrast, booms tend to be shorter than standard upturns. A typical boom in housing on average lasts about six quarters while a boom in equity markets lasts much longer.

What happens when financial cycles coincide?

To answer this question, we employ a simple timing rule. We consider a downturn in one financial variable to be associated with a disruption in another if the downturn in one starts at the same time or shortly after the disruption in the other variable. We employ a similar approach with upturns. Across the various combinations we explore, we find the strongest interactions between credit and housing markets (Figure 3).

Figure 3 Strong interactions between credit and housing markets



Notes: A credit downturn (or upturn) is accompanied with housing bust (boom), if it starts at the same time or after the beginning of an ongoing episode of the housing episode. The duration refers to the sample mean and the amplitude is the sample median. See notes to Figure 1.

- Credit downturns that overlap with house price busts are longer and deeper than other credit downturns.
- When credit upturns coincide with housing booms, they tend to be longer and stronger. These findings are suggestive of the important role that mortgage lending plays in many financial markets.
- Equity cycles seem to be little affected when they are associated with cycles in other financial markets, probably because of the idiosyncratic nature of factors driving fluctuations in equity markets.

There is also a strong global component to most financial cycles (see also Rey 2013).

What are the main lessons and policy implications?

Two major features of financial cycles stand out from our study:

- They can be long and deep, especially those in housing and equity markets.
- They accentuate each other and become magnified, especially during coincident cyclical episodes in credit and housing markets.

This suggests that it is important to account for the interactions among cycles in different financial market segments when designing regulatory policies aimed at ensuring the overall health of the financial system, especially in terms of the design of macroprudential rules. For example, our results indicate that, as cycles in credit and housing markets tend to enhance each other, if both credit and house prices are growing rapidly it might be necessary to employ stricter rules and standards for mortgage lending and to build larger countercyclical buffers to moderate any adverse impact on banks when the cycles turn.

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Unintended consequences of macroprudential policies

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In a response to the Global Crisis, policymakers have taken a number of initiatives to curb systemic risk. However, little thought has been given to how the financial system will react to these measures. This chapter focuses on countercyclical policies as a particular macroprudential policy tool. The author discusses five different areas in which such policies might have unintended effects. Such side-effects could be much larger than with traditional policies. Policymakers should therefore make sure that macroprudential policies are incentive-compatible

It is well known that the financial system tends to react to new policies in surprising – and often undesirable – ways. This insight is essentially an application of the Lucas critique in economics; in banking circles referred to as Goodhart's Law (Goodhart 1975).

The typical regulatory cycle looks as follows. An unwanted behaviour in the financial system is observed and is attributed to a market failure. Policymakers devise a policy that specifically targets this failure. Upon implementation, it is then discovered that the policy does not work. This is because financial institutions circumvent the spirit of the policy by shifting into economically equivalent activities that are not affected by regulation. In addition, the responses of market participants often lead to undesirable

outcomes in other parts of the financial system.[1] The apparent failure of regulation in turn leads to a series of new, and increasingly complex, measures, which by themselves bring about further unintended consequences.

A case in point is risk-based capital regulation. The first Basel accord aimed at addressing market failure arising from risk-taking by banks. Basel I for the first time required banks to hold capital commensurate with the level of risk on their balance sheets. The prescribed risk-weights, however, were very crude. This allowed banks to engage in regulatory arbitrage by shifting from assets with high Basel weights but low economic risk into risky assets with low weights. The second Basel accord recognised this issue and allowed banks to use weights that more accurately reflect perceived economic risk. This, however, created a new problem. As risk perceptions vary over the cycle, capital requirements effectively became less stringent in booms and tighter in busts. This resulted in more procyclicality in the financial system. Basel III responded to this with the introduction of countercyclical buffers – buffers that are built up in good times when credit growth is excessive and which can be run down in bad times.

The lessons from the past, however, seem to have been largely forgotten when it comes to the design of new policies. In particular, in response to the Global Crisis regulators have started a number of initiatives to curb systemic risk. Besides the countercyclical buffers of Basel III, these include (among others) capital surcharges for systemically important institutions and central clearing of derivatives transactions. So far, little thought has been given as to how the financial system will react to these new measures. The experiences with previous policies should make us very cautious in this regard. On the face of it, we would expect the potential for adverse side effects to be significantly larger for system-based regulation. This is because such regulation is inherently more complex than traditional regulation that was focused on individual institutions only. The difficulty of properly predicting the impact of a policy rises with its complexity.

1 For instance, tight regulation in the core banking system can cause a build-up of risk in the less regulated shadow banking system.

High complexity also provides ample opportunities for financial institutions to sidestep new regulation.

In this chapter, I want to highlight a few dimensions along which macroprudential regulation may result in surprising outcomes. The consequence may not always be bad, and may even work to reinforce the original spirit of the policies. My focus will be on countercyclical policies; they are probably the systemic tool that is most developed at this stage.

There is a strong rationale for countercyclical policies. The experience of recent years has reinforced our view that the financial system tends to amplify shocks over the cycle, leading to excessive lending in boom times and sharp contractions when economic conditions deteriorate. This cyclical behaviour is commonly explained by the presence of frictions. In particular, players in the financial system are subject to constraints that tend to exacerbate shocks, such as borrowing constraints that fluctuate with asset prices or remuneration schemes based on relative performance.

I will in turn discuss five areas in which countercyclical policies are likely to have effects outside their intended realm.

1. Systemic risk-taking

Policies aiming at curbing procyclicality are likely to interact with another dimension of the systemic risk: the extent to which institutions in the financial system are correlated with each other. Such cross-sectional risk can arise through various channels: herding in investment activities, the use of common funding sources, but also because of convergence of risk management practices and trading strategies.

In a recent paper (Horvath and Wagner 2013), my co-author and I have shown that countercyclical policies have the potential to increase cross-sectional risk. The intuition is simple. Under countercyclical capital requirements, banks are subjected to relatively higher requirements when the economy is doing well but to lower requirements in

bad times. Such requirements insulate banks from economy-wide fluctuations, as they require more capital only when capital is generally abundant and less capital when it is costly to raise it. However, they do not insulate banks from fluctuations in bank-specific, idiosyncratic conditions. In particular, a bank that focuses more on idiosyncratic exposures runs the risk that it will experience stress at a time when other banks are doing well. In this case, the bank would be subject to high capital requirements when it is most costly. The consequence is that countercyclical policies increase the incentives for banks to correlate with each other. Systemic risk may thus increase, rather than fall.

There is some evidence for this mechanism being at play coming from developing countries. While with the exception of Spain, capital requirements have not been consistently used for macroprudential purposes, Frederico et al. (2012) show that developing countries have made active use of reserve requirements over the business cycle. Defining countercyclicality as the correlation of reserve requirements with GDP, Frederico et al. find that the majority of these countries used reserve requirements in a countercyclical fashion.

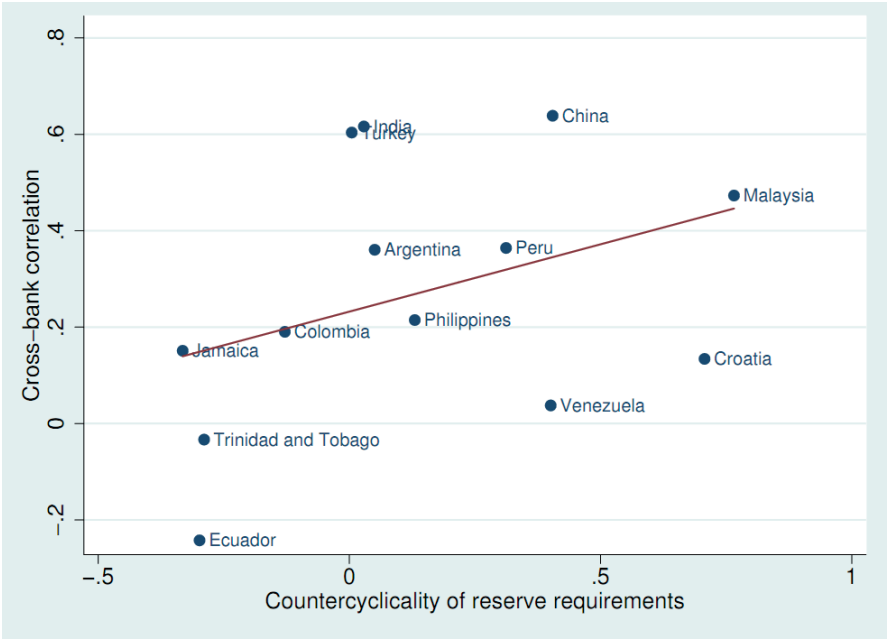
Figure 1 plots their measure of countercyclicality against the average pair-wise correlation of banks in the respective countries. The figure shows a positive relationship between countercyclicality and bank correlation.

How could regulation respond to this problem? An alternative to countercyclical buffers is to incentivise banks to become less correlated. For example, regulators can impose higher capital requirements for systemic banks.[2] The analysis in Horvarth and Wagner (2013) shows that such a policy would dominate countercyclical buffers in the presence of incentive problems. This is because it addresses two dimensions of systemic risk at the same time. First, it discourages correlation among banks. Second, by doing so it makes the system less procyclical as more heterogeneous institutions will respond less

2 For this, systemic risk can be quantified using measures such as the CoVar (Adrian and Brunnermeier 2011) or the Systemic Expected Shortfall (Acharya et al. 2012).

strongly to aggregate shocks. In contrast – as argued before – countercyclical policies improve systemic risk along one dimension at the potential cost of worsening it along another.

Figure 1 Countercyclicality of reserve requirements is the correlation between the cyclical component of reserve requirements and real GDP



Notes: Cross-bank correlation is the average pair-wise correlation of banks using weekly stock returns from September 2011 to September 2012.

2. Voluntary capital buffers

Banks typically hold capital well in excess of regulatory minimum requirements. This is because they want to guard themselves against adverse shocks that would otherwise threaten their lending capacity. Higher capital requirements thus only have real affects to the extent that they do not lead to compensatory changes in buffers. Anticipation of relatively loose capital requirements in downturns, however, will makes banks less

averse to such downturns, and result in lower buffers. The effect of countercyclical policies may thus be partially offset by fluctuation in bank's voluntary buffers.[3]

3. Incentives of regulators

It is well known that financial regulation suffers from a time-inconsistency problem, similar to that arising for monetary policy. Ex ante, regulators have an interest in being tough in order to limit risk-taking in the financial system. However, ex post, regulators are likely to bail out financial institutions in order to safeguard the stability of the financial system. This time-inconsistency problem is arguably a major source of risk-taking in the financial system. [4]

Microprudential capital regulation was not prone to this problem because it was rules-based. Regulators could not easily deviate from Basel standards in a discretionary fashion and hence there was little pressure to adjust capital requirements in the advent of shocks. This will all change with Basel III, which introduces an important discretionary element. Basel III contains guidelines for when countercyclical buffers should be invoked, but the ultimate decision is left to the regulators. There are good reasons for this. In contrast to monetary cycles, it is more difficult to quantify credit cycles. It is hence important to leave significant room to regulators as to when to implement countercyclical policies.

However, this discretion introduces a significant time-inconsistency problem. Ex post, regulators will always have incentives to reduce the impact of negative shocks on the financial system. They are thus likely to allow banks to run down capital buffers in downturns. The opposite is not likely to happen following positive shocks. Pressure from the financial industry and politicians will make it difficult for regulators to impose

3 For a quantitative analysis of the impact of Basel-regulation on capital buffers see Repullo and Suarez (2013).

4 See Acharya and Yorulmazer (2007) and Farhi and Tirole (2012) for an analysis of time inconsistency leading to systemic risk on the asset and liability side, respectively.

additional capital when excesses start to materialise. The problem is compounded by the fact that it is near impossible to accurately measure when a boom becomes excessive. It will hence be difficult to hold regulators accountable for their decisions.

Ex post, regulators thus will have a tendency to be lenient in their countercyclical policies. This is likely to create ex ante moral hazard, in a way similar to bailing out expectations. Because of this, endowing regulators with a countercyclical tool can easily reduce welfare in the financial system (Horvath and Wagner 2013).

4. Endogenous booms

This is, in my view, the most important but also the least understood area.

Basel III views booms and bust as discrete and exogenous events. Buffers are implemented when an excessive boom (by some measure) materialises, while buffers can be released if there is a sufficiently severe downturn.

Cycles, however, develop over time. The response to a shock can initially be small but may be amplified later on. More importantly, cycles are to a large extent endogenous – they are not simply driven by a series of fundamental shocks. In particular, the literature on the nexus between finance and macroeconomics has emphasised that there are various feedback and amplification mechanisms that can lead to the endogenous build-up of a boom.[5]

The endogenous nature of booms has immediate consequences for macroprudential policies. First, anticipation of higher capital requirements if a boom turns excessive may prevent the boom from ever reaching the excessive stage in the first place. Many feedback mechanisms rely on inter-temporal amplification, that is, on the knowledge that the impact of a shock is magnified over time. From theoretical studies on bubbles, for example, it is known that in order for bubbles to exist, it is crucial that there is

5 See, for instance, Kiyotaki and Moore (1997).

the possibility that the bubble can go on forever. The presence of a regulator who is committed to pricking bubbles when they reach a certain size may prevent their formation. Capital surcharges imposed in boom times will hence have implications for bank behaviour in normal times, which in turn will affect the likelihood and severity of booms.

Second, policies in pre-boom times matter as well. For instance, a policy that gradually increases capital requirements as the boom forms may stop the boom from ever becoming excessive. Discrete buffers akin to Basel III may then never have to be invoked.

5. Cross-border banks

The financial cycles of countries are not perfectly aligned. This means that countercyclical buffers will be imposed in different countries at different points in time. This has implications for internationally operating banks, which can easily move capital across borders. For instance, in response to higher capital requirements in one country, banks may redeploy lending capacity in another country, potentially triggering a boom there. Since we are unlikely to end up in a world where regulators effectively coordinate capital requirements across countries, this gives rise to another distortion in the financial system.

Conclusion

We should heed more the lessons from the past when implementing macroprudential policies. Naively designed macroprudential policies are likely to have unintended effects. Due to the inherently complex nature of systemic policies, the scope for such side effects is much larger than for traditional policies, and may easily come to outweigh the benefits. Policymakers need to step up their efforts in making sure that new macroprudential policies are incentive-compatible and do not distort the behaviour of participants in the financial system.

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A leverage ratio for the banking system: A macro instrument

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Macroprudential policies need a macroeconomic focus and thus require a macroeconomic tool. This chapter suggests that such a macroeconomic tool is the banking system capital ratio (or system leverage ratio). It illustrates the suitability and limits of the tool by a series of examples and outlines an institutional framework for monetary policy, macroprudential policymaking and microprudential regulation. The chapter also outlines how risk-sensitive capital requirements can be combined with a system leverage ratio.

1 Introduction

How to organise macroprudential policy and how to embed such policy into a comprehensive framework of microprudential regulation of banks and monetary policy is arguably one of the most important, but unresolved issues in policymaking. In this paper we suggest that a banking system capital ratio – or equivalently a leverage ratio for the banking system – is a suitable *macroeconomic* tool for the implementation of macroprudential policies.[1]

1 This is a short, updated version of Gersbach (2011). In the present version, we focus on the key ideas regarding macroprudential policies.

Why do we need such a 'macro tool'? First, macroprudential policies[2] aim at moderating credit cycles and reducing the likelihood of banking crises and their negative consequences for the real economy.[3] Hence, macroprudential policies need a macroeconomic focus – and necessitate a macroeconomic tool.

Second, a central bank finds it difficult to fulfil both its primary objective of price stability and its secondary objective of output stability via short-term interest rates. Moreover, interest rate policies are not an effective instrument to attain financial stabilisation objectives. A highly vulnerable banking system cannot be made resilient through interest rate policies, for instance.[4] Hence, pursuing financial stability objectives without new macro instruments would exacerbate the difficulties of macroeconomic policymaking to fulfil its objectives, as the Tinbergen Rule suggests. These observations indicate that it is necessary to develop a macro instrument for macroprudential policymaking.

2 The system leverage ratio

2.1 Definition

To construct a leverage ratio for the banking system, we define the aggregate capital ratio (ACR) of the banking sector[5] as the ratio of:[6]

2 On the origin and current state of macroprudential thinking, see Borio (2011).

3 Pursuing the first objective can help achieve the second one. However, conflicts can also arise between these two objectives. Encouraging banks to lend more in times of recession might lower financial stability (see Gersbach and Rochet 2012 and Hellwig 2014).

4 However, monetary policy cannot be separated from policies ensuring the stability of the banking system. On the one hand, central banks act as a lender of last resort to commercial banks, and may be a central actor in resolving banking crises by providing liquidity or by implementing unconventional policies. On the other hand, monetary policy – be it lax in a boom or tight in a downturn – affects banking stability. This necessitates a consistent framework for monetary policy, macroprudential policy, and microprudential regulation, as outlined in Gersbach (2011), for instance.

5 Ideally, the banking system comprises commercial banks, universal banks, and leveraged investment banks. Unleveraged financial institutions such as pension or mutual funds, as well as insurance companies, are not included. In our context, equity capital is best thought of as Tier 1 capital.

6 A formal definition is given in Gersbach (2011).

- total equity in the banking sector (held by non-banks) to
- total end-borrower lending (loans to non-financial firms, households, and governments), plus other non-bank assets.

A number of remarks must be made here. First, the ACR is a minimum requirement for the banking system. Second, a given value of ACR is compatible with a wide range of capital ratios (and thus leverage ratios) for individual banks, as interbank relations on the asset and liability side are netted. Moreover, a given ACR is consistent with a banking system in which some banks have high capital ratios and others have low ones. Third, while the ACR focuses on the banks' balance sheets, it is important to account for off-balance-sheet positions – either by incorporating them or by reducing the equity capital that can be used for the calculation of the ACR and bank-specific capital requirements accordingly.[7]

2.2 The responsible authority: Three institutions

Who should have the power to perform macroprudential policies and to use and vary the aggregate capital ratio? This is a challenging issue. In a world of frictionless coordination:

- monetary policy should be delegated to an independent central bank,
- macroprudential policy should be delegated to an independent macroprudential policymaker, and
- a third authority should be in charge of bank-specific regulation and supervision.

There are two basic lines of argumentation that justify this institutional framework. First, according to Gersbach and Hahn (2011), macroprudential policymaking should be separated from monetary policy, as the latter suffers from time-inconsistency problems. As a consequence, the delegation of monetary policy to a conservative central banker is

7 Moreover, one has to recognise that the ACR depends on accounting standards. Its use thus depends on both the understanding of these standards and their consistency across time.

desirable, as he is not – or is less – tempted to engage in futile output stabilisation. Such conservative central bankers would pursue inefficient ACR policies.[8] Moreover, there can be trade-offs between the central banks' macroeconomic mandate and financial stability. A central bank may want banks to lend more in a recession to smooth the cycle, for instance. This can contribute to future financial instability (Hellwig 2014).

A second line of reasoning suggests that it is best to delegate macroprudential policymaking to an independent institution that is separated from bank-specific regulation and supervision. First, aggregate bank-capital policy is a flexible rule determined by the policymaker, and is thus quite different from a formula- and law-based determination of bank-specific capital requirements. Second, aggregate bank-capital policy affects the entire economy, including the returns that shareholders, debt holders, and bank managers will earn. As a consequence, there may be fierce lobbying against raising aggregate bank equity. This problem can be alleviated by making the macroprudential authority independent of the government, like central banks. Third, if this authority is independent, there will be less risk of the policymaker's horizon being too short and his policies being too lenient.

Of course, although both central banks and macroprudential policymakers are set up as independent institutions, information-sharing regarding the current state of financial stability among microprudential regulators and these two institutions is essential.

2.3 The responsible authority: Two institutions

Suppose next that macroprudential policy, microprudential regulation and monetary policy have to be performed by two public authorities. This constraint may arise because the frictions (e.g. information-sharing and coordination) generated by the delegation of

8 Time-inconsistency problems may also arise in aggregate bank-capital policies. From an ex ante perspective, committing to high aggregate capital ratios may be desirable to prevent banks from taking excessive risks. In a downturn, following this policy may not be optimal ex post, as this may cause excessive deleveraging of banks and generate a credit crunch.

the policy framework to three institutions are too large, or because the three-institution framework may not be politically feasible.

Allowing bank regulators to define both aggregate bank-capital policy and bank-specific capital requirements would lead to the problem of regulatory capture set out in the preceding paragraphs. Moreover, pursuing aggregate bank-capital policy and determining bank-specific capital requirements in the same institution may create a variety of conflicts, as, like monetary policy, macroprudential policymaking involves discretion and relies on judgement, while bank-specific capital requirements are formula-based.[9]

Entrusting the central bank with macroprudential policymaking has the following advantages. Information from bank-capital policymaking might be valuable for monetary policies and vice versa.[10] Moreover, interest-rate policy impacts the credit supply of financial intermediaries, which, in turn, affects the optimal level of aggregate bank capital. Thus, maintaining both macro instruments in one hand facilitates policy coordination.

These advantages have to be traded off against the benefits of separating aggregate bank-capital policies from monetary policies, as discussed in Section 2.2. Furthermore, creating an authority with such wide-ranging competencies can bring about a concentration of power that democratic societies may not want to permit.

2.4 Bank-specific capital requirements

All regulatory tasks and tasks of supervision, other than setting the banking system's leverage ratio, are to be executed by bank-regulatory authorities. These authorities act

9 However, bank regulators also need to use their judgment when they apply the second pillar of Basel III and assess the professional quality of bank managers, for instance.

10 See Peek et al. (1999).

under the aggregate capital ratio constraint. There are different ways of determining bank-specific capital requirements.[11] We provide three main alternatives.

- *Non-risk-sensitive bank-specific capital requirements*

Each bank faces the same capital requirement such that the ACR is met.

- *Simple-risk-adjusted bank-specific capital requirements*

Bank-specific capital requirements as calculated in the first alternative are adjusted upwards or downwards, depending on the comparative riskiness of a particular bank's asset portfolio. The relative riskiness of a bank's asset portfolio compared to the average determines whether bank-specific capital requirements are increased or lowered in relation to non-risk-sensitive capital requirements via a simple formula. At the aggregate level, capital requirements have to meet the ACR.

- *Risk-sensitive capital requirements (à la Basel III)*

In the same spirit, the risk-sensitive capital requirements calculated according to Basel III can also be used to determine bank-specific capital requirements. These capital requirements are multiplied by a certain factor, such that the ACR constraint is just met at the aggregate level.[12]

11 In Gersbach and Hahn (2010), we explore a specific implementation in detail.

12 The discretionary capital buffer envisioned in Basel III could be used as a first step when introducing the ACR as a macro policy instrument. See Repullo and Saurino (2011) for a critical assessment of the countercyclical buffer in the new regulatory framework of Basel III.

3 Applications and examples

3.1 Transmission channels

As observed in Gersbach (2011), the leverage ratio of the banking system is sufficiently independent of short-term interest rates, i.e. it operates through different transmission channels, and its appropriate choice can foster the resilience of the financial system.

A full account of all conceivable transmission channels for changes of aggregate bank equity capital is as complex as a corresponding account of those for monetary policy would be. The following effects could be at work when aggregate capital ratios are increased:[13]

- The risk of banking crises is lowered and thus output is stabilised.[14]
- Aggregate demand or aggregate supply is reduced temporarily.
- The natural level of output declines.
- Lending cycles are moderated.

The first channel is the major justification for using the ACR as a macro instrument. Higher aggregate bank equity – relative to assets – reduces excessive risk-taking by banks[15] and constitutes a larger buffer if there are negative shocks to the assets in the

13 Further channels have been identified in the literature. Diamond and Rajan (2001) and Van den Heuvel (2008), for instance, suggest that higher bank equity capital reduces the liquidity provision by banks, and is therefore welfare-reducing. The impact of bank equity capital regulation and its interaction with monetary policy have also been taken up in DSGE models. Meh and Moran (2010), Gertler and Karadi (2011) and Angeloni and Faia (2013) are leading contributions that also emphasise intertemporal feedback effects when bank capital regulation and monetary policy are determined jointly and endogenously.

14 A banking crisis occurs when a significant part of the banking system is, or is perceived to be, insolvent – or illiquid – thereby threatening the functioning of financial intermediation and the financial infrastructure in the economy.

15 There is an extensive literature on the relationship between equity levels and excessive risk-taking (see Freixas and Rochet 2008).

banking system. As a consequence, the likelihood of banking crises is lowered.[16] The other channels are discussed in Gersbach (2011) and Gersbach and Rochet (2012).

To sum up, increasing the ACR affects the real economy in different ways. A higher ACR lowers the likelihood of crises and might negatively impact output.[17] In most cases, inflation is not affected more than a little. Hence, the ACR is a macro instrument whose economic impact is largely different from the influence exerted by the short-term interest rate.

3.2 Examples

We now illustrate the joint determination of the ACR and short-term interest rates for several macroeconomic circumstances.

- *Example 1: Low-inflationary boom*

Suppose that a favourable supply shock increases output and lowers inflation. Then, raising the ACR is the most important instrument to moderate the boom and reduce the risk of a banking crisis. An increase in the ACR would be more pronounced if monetary aggregates and bank balance sheets expanded rapidly and if additional vulnerabilities manifested themselves in the banking sector. Monetary policy plays a minor role, but could complement the ACR policy to ensure smooth adjustments of economic activities.

- *Example 2: High-inflationary downturn*

If the economy is hit by adverse supply shocks that drive up inflation and reduce output, the ACR can be lowered to stimulate output and to complement tighter monetary policy

16 Of course, this aggregate perspective on the banking system neglects the fact that two banking systems with the same ACR and the same aggregate non-bank assets and non-bank liabilities may face different probabilities of collapsing, as equity capital distributions and the web of interbank relationships may differ. By requiring a higher ACR for the more vulnerable banking system, different levels of risk can be corrected.

17 Whether such output losses could occur at all, and in which circumstances, has been the subject of an intensive debate (see Admati and Hellwig 2013).

for the stabilisation of inflation (see Gersbach and Hahn 2011). However, while such an application of the two macro instruments may reduce the severity of a credit crunch and of a recession today, it may weaken banks and raise the risk of future downturns, which, in turn, may require restructuring and recapitalisation of the banking system to avoid long periods of stagnation (see Hellwig 2014).

- *Example 3: Low-inflationary downturn*

If fighting inflation is not important, low interest rates can help to smooth recessions,[18] together with lowering the ACR. Moreover, if the downturn is associated with a credit crunch caused by weak banks, an additional cleanup of the banking system as described in Example 2 is required.

- *Example 4: Demand shocks*

Suppose that the economy is hit by a pure aggregate demand shock. As demand shocks can be stabilised by monetary policy, the ACR can be left unchanged (or adjusted, if the fragility of the banking system is affected), as interest rate changes suffice to stabilise such shocks (Gersbach and Hahn 2011).

- *Example 5: Pure vulnerability shocks*

Suppose that vulnerabilities build up in the banking sector, without an apparent accompanying macroeconomic shock. In such circumstances, raising the ACR is the instrument of choice. Such vulnerability build-ups come in very different forms. For example, asset and real estate price increases enable banks to rapidly expand their lending, as collateral values increase. This, in turn, makes banks vulnerable to sudden drops in asset and real estate prices. Other examples are more fragile interconnections between banks with increasing reliance on short-term funding or highly correlated risky investments in domestic or foreign markets.

18 Such attempts can be constrained by the zero bound.

Overall, these examples illustrate how monetary policy and aggregate bank-capital policy can jointly stabilise shocks in the economy and may anchor expectations regarding inflation and robustness of the financial system. The examples also suggest that these two macro instruments can set the basis for a sound economy and a robust banking system. The use of the ACR can also lessen – or avoid – the procyclicality of traditional microprudential capital requirements.

4 Implementation of macroprudential policies

As macroprudential policymakers face challenges that are similar to those met by monetary policymakers, important lessons from monetary policymaking should not be forgotten. The aggregate capital ratio for the next period, for instance, depends on the ratio that is currently set, the state of money and credit,[19] and on current vulnerabilities of the banking system. While it is impossible to specify a fixed formula for determining the aggregate capital ratio, it will be essential that such policies are systematic, transparent, and accountable as traditional monetary policy rules. A more complete assessment of the parallels between monetary policy and macroprudential policy is summarised in Gersbach and Hahn (2009), which also advocates a cautious use of sophisticated models, not only in monetary policy but also in aggregate bank-capital policy.

5 Conclusion

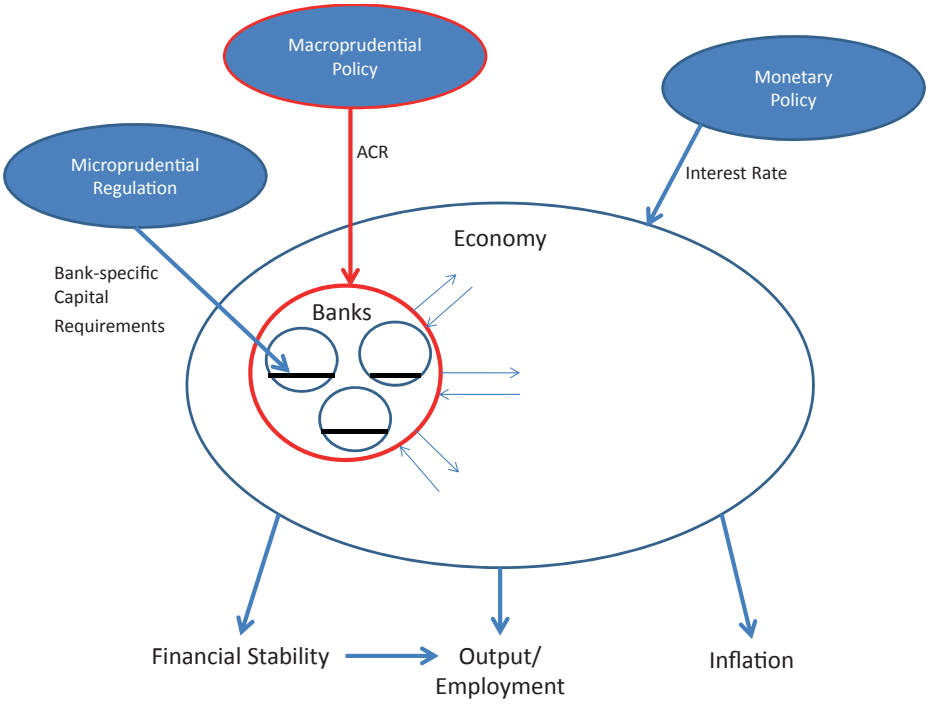
It is important to keep in mind that while varying the ACR is a suitable macro instrument for macroprudential policies, it is no panacea. Banks tend to find ways of economising on capital requirements, which may themselves raise the vulnerabilities of the banking system. Some of these attempts to economise – such as off-balance-sheet positions – can

19 On the importance of broader monetary aggregates in assessing the vulnerability of the banking sector, see Adrian and Shin (2009).

be incorporated into the calculation of the ACR, while emerging financial innovations will require that aggregate bank-capital rules be adjusted to new developments.

Numerous further aspects of our new macro tool and of the entire framework (see Figure 1), which integrates monetary policy, macroprudential policy and microprudential regulation, deserve further scrutiny. Yet we expect that a leverage ratio for the banking system would enable societies to better safeguard the resilience of the banking system and the stability of the real economy as a whole.

Figure 1 ACR embedded in the broader policy and regulatory framework



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The simple analytics of systemic liquidity risk regulation

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How should systemic risk be regulated? This chapter assesses the performance of Pigouvian taxes and quantity-based regulations in containing the social costs of high-risk banking. Depending on how banks differ, the socially efficient solution may be attained with either Pigouvian taxes or quantity regulations, or a combination of both.

The recent Crisis has provided a clear rationale for the regulation of refinancing risk – an aspect that was overlooked in the pre-Crisis agreement on international banking coordination known as 'Basel II' (see Acharya and Merrouche 2009).

The liquidity proposals in the current agreement, Basel III, rely on quantity-based requirements to contain liquidity risk as a risk externality. They take the form of larger liquidity buffers and fixed limits to the size of unstable funding. But tight fixed ratios are seen by industry as very expensive, and they are likely to be significantly watered down. In the absence of other tools, the task of containing systemic liquidity risk would remain unfulfilled.

- Short-term funding has advantages, as it can support rapid expansion of credit over GDP (for instance, because insured deposit supply expands slowly, or because short-term lenders do not need to become informed about bank credit risk).

However, given its limited commitment, short-term funding creates refinancing risk.

Sudden withdrawals may:

- lead to disruptive liquidity runs (Diamond and Dybvig 1983);
- cause fire sales which spread losses; or
- trigger counterparty risk externalities for exposed intermediaries (Brunnermeier 2009; Allen et al. 2010).

Each bank›s funding decision has an impact on the vulnerability of asset prices to liquidity runs. So even if an individual bank takes into account its own exposure, it will not internalise its contribution to system-wide cost – a classic externality (Perotti and Suarez 2009). The wedge between the net private value and the social cost of short-term funding ensures that banks rely excessively on short-term funding.

A recent example is the massive build up in wholesale funding ahead of the Crisis. Overnight (repo) secured credit feeding the final stage of the securitisation wave grew explosively during 2002-07 to a volume over $10 trillion (Gorton 2009). This expansion in highly secured debt claimed significant priority over bank assets, and made unsecured wholesale funding more vulnerable (Matta and Perotti, 2014). Rapid withdrawals forced unprecedented liquidity support by central banks, undermining their control over the money supply. The need to contain future accumulation of liquidity is thus a core challenge for macroprudential policy.

New insights on regulating systemic risk

In the tradition of externality regulation led by Weitzman (1974), in Perotti and Suarez (2011) we assess the performance of Pigouvian taxes (aimed at equating private and social liquidity costs) and quantity-based regulations in containing this systemic externality. As in Weitzman (1974), the optimal regulatory tool depends on the response

elasticity of banks, recognising that the regulator is information-constrained in targeting individual bank characteristics.[1]

Our results show how the industry response to regulation depends on the composition of bank characteristics, as banks differ in their credit ability and their incentives to take risk. Banks earn decreasing returns to expanding credit to their (monitored) borrowers, so better banks naturally wish to lend more. Shareholders of less capitalised banks gain from investing in poor gambles, since they retain the upside and shift the downside risk to the public safety net (or alternatively, because they are run by self-interested and overconfident managers who view excessive risks as profitable). We find that depending on the dominant source of heterogeneity, the socially efficient solution may be attained with either Pigouvian taxes or quantity regulations, or a combination of both.

Variation in banks' credit quality

When banks differ only in their capacity to lend profitably (reflecting credit assessment capability or access to credit opportunities), a simple flat-rate Pigouvian tax on short-term funding (possibly scaled up by the systemic importance of each bank, for example to capture contribution to counterparty risk) implements the efficient allocation. The intuition is that levies on liquidity risk allow better banks to lend more, without the need for regulators to be able to identify the better banks. In this context, a quantity approach such as a net stable funding ratio or a liquidity coverage ratio (such as those imposed by the Basel Committee on Banking Supervision in December 2010) would be highly distortionary, reallocating credit away from banks with good lending opportunities.

Net stable funding ratios which impose an upper limit on short-term debt do reduce overall liquidity risk, but also redistribute liquidity risk inefficiently across banks. Banks with better credit opportunities will be constrained, while the reduced systemic

1 The approach is also related to the classical discussion by Poole (1970) of the optimality of price or quantity monetary policy instruments when the system to regulate is affected by several types of shocks.

risk actually encourages banks with low credit ability (for whom the requirement is not binding) to expand.

Buffers are either ineffective or procyclical

Liquidity coverage ratios that require banks to hold fractional reserves of liquid assets against short-term funding work as a de facto tax, but with poor incentive effects. In boom times, the yield on liquid assets equals the cost of short-term liabilities, as was the case prior to the Crisis. At this time, buffers impose no cost on carrying liquidity, so banks will simply increase their gross short-term funding such that their net short-term funding is as high as in the unregulated equilibrium. The only effect is an artificial bank demand for liquid assets – traditionally kept in money market mutual funds rather than banks.

When the spread between liquid asset yields and bank borrowing costs is positive, a liquidity requirement operates as a tax on short-term funding, but the effective tax rate will be market determined – the tax rate will equal the product of the buffer requirement per unit of short-term funding and the interest spread. In the recent experience, interbank spreads over safe assets were minimal just as aggregate liquidity risk was building up, but they escalated once the Crisis started. Unless buffers are adjusted frequently, they would contribute to procyclical effects, decreasing the opportunity cost of unstable funding in good times and increasing it after a shock.

Variation in banks' solvency incentives

Banks vary not only in their credit quality, but also in their solvency incentives. These incentives reflect capitalisation and charter value, or behavioural determinants of risk-taking (such as overconfidence). This qualifies the results radically. Low charter value (or more risk-loving) banks have incentives to gamble to shift risk to deposit insurance and other forms of support (Keeley 1990).

We show that when bank decisions are overwhelmingly driven by gambling incentives, banks are not properly deterred by levies, while quantity constraints are more effective. Both short-term funding limits (such as a net stable funding ratio) and capital requirements can contain risk-shifting by limiting the scale of lending. Levies will not be very effective because the banks most inclined to gamble will also be those most inclined to pay the tax and expand their risky lending. In this case, quantity instruments such as net funding or capital ratios are most suitable to contain excess credit expansion.

Combining quantity limits and liquidity charges

Our analysis of the relative merits of price versus quantity instruments suggests that combining both may be adequate for the simultaneous control of gambling incentives and systemic risk externalities. However, this presumes that the regulator controls can only act on regulatory tools related to liquidity risk. If strengthening capital requirements is an effective strategy for the control of gambling incentives (see, for example, Hellmann et al. 2000), the case for regulating liquidity risk with levies on short-term funding is considerably reinforced.

The approach identifies recommendations for the use of ratios and charges. For instance, levies may be less costly to adjust than ratios. They may be easier to change, for example in the likely case of regulatory ratios being embedded in an international agreement while levies are under the control of a macroprudential authority. More importantly, they would impose lower adjustment costs than changing funding volumes at short notice.

Similarly, changes in levies are less likely to induce procyclicality than buffers, since the effect of a Pigouvian charge is under the more direct control of the regulator rather than being set by the interaction of a (controlled) quantitative requirement and the (freely fluctuating) market price of the rationed quantity.

For preventive purpose, controlling time-varying liquidity risk may be best achieved by a combination of some (variable) levies aimed at controlling the generation of risk externality by normal banks and ratios aimed at containing the appetite for risk of gambling banks.

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Externalities: An economic rationale for macroprudential policy

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Macroprudential policy should be justified by market failures. This chapter discusses key externalities across financial institutions and from financial institutions to the real economy that rationalise the need for macroprudential policy. The authors link each externality to recently proposed macroprudential policy tools, and argue that although various tools can correct the same externality, these tools are best seen as complements rather than substitutes. Capital surcharges, more than any other tool, can be effective in dealing with any of the externalities.

The purpose of macroprudential policy is to reduce 'systemic risk'. While hard to define formally, systemic risk is understood as "the risk of developments that threaten the stability of the financial system as a whole and consequently the broader economy" (Bernanke 2009). The notion is meant to include the types of financial imbalances that led to the 2007-08 bust.

It is common to distinguish two key aspects of systemic risk. One is the 'time-series dimension': the procyclicality of the financial system, which manifests itself in excess risk-taking in booms and excess deleveraging in busts. Another is the 'cross-sectional dimension': the risk of contagion due to the simultaneous weakness or failure of

1 The views expressed are those of the authors and do not represent the views of the IMF or the Federal Reserve System, their management, board, or any affiliated organisations.

financial institutions. Accordingly, macroprudential policy it thought of as a set of tools that help reduce these two forms of risk (Borio 2009, Bank of England 2011).

Yet thinking about macroprudential policy by looking solely at these two dimensions of risk is unsatisfactory. First, this view, per se, does not provide a justification for regulatory intervention. For example, is it really desirable to avoid any form of cyclicality and have zero risk of contagion in the financial system? Second, it is not a priori clear what macroprudential policy can achieve that traditional microprudential regulation cannot.

Understanding market failures

In our study (DeNicolò et al. 2012), we aim to better articulate the economic rationale of macroprudential policy. As for any regulatory intervention, the objective of macroprudential regulation must be to address market failures.

Key market failures that create systemic risk are the risk externalities across financial institutions and between the financial sector and the real economy. The literature allows us to classify such externalities as being driven by:

- *strategic complementarities (herding)*: the strategic interactions of financial institutions causing the build-up of vulnerabilities during the expansionary phase of a financial cycle;
- *fire sales*: the generalised sell-off of financial assets causing a decline in asset prices and a deterioration of the balance sheets of intermediaries; and
- *interconnectedness*: the risk of contagion caused by the propagation of shocks from systemic institutions or through financial networks.

The need to correct these market failures offers a clear economic rationale for macroprudential policy.

The idea that macroprudential policy is needed to correct market failures rather than to smooth financial cycles is important, because prudential measures that restrict credit availability (and possibly bank profits) may encounter non-trivial political challenges. The identification and correction of market failures is a clearer, uncontroversial objective for a macroprudential regulator.

The emphasis on market failures that arise because of interaction between financial institutions also helps clarify why microprudential regulation is not enough to contain systemic risk. Microprudential regulation focuses on the individual stability of financial institutions. Having strong individual institutions is necessary, but not sufficient, to minimise systemic risk. For example, microprudential policy may not take sufficient account of correlation risks, or a focus on maintaining high capital ratios of individual institutions during a recession may result in asset fire sales, exacerbating existing vulnerabilities. Hence the need for additional, macroprudential policy to try to correct such market failures.

Optimal tools

The policy debate has suggested a number of macroprudential policy tools: pro-cyclical and systemic risk-based capital surcharges, dynamic provisioning, liquidity regulation (including dealing with the risks of wholesale funding), lending limits (LTV and DTI caps), restrictions on activities (Volcker and Vickers rules), and different forms of corrective taxes.

An analysis of how these tools can correct the three identified externalities, summarised in Table 1 below, offers some important implications for the design of macroprudential policy.

Table 1 Externalities and macroprudential policies

Externalities due to:	Can be addressed by:			
	Capital requirements (surcharges)	Liquidity requirements	Restrictions on activities, assets or liabilities	Taxation
Strategic complemetarities	x		x	
Fire sales	x	x		x
Interconnectedness	x		x	x

One important finding of the analysis is that each of the externalities can be corrected by multiple policy tools.

For example, both capital requirements and limits on bank asset allocation can correct the externalities associated with strategic complementarities of banks. Capital requirements induce banks to internalise more of the cost of engaging in risky lending; restrictions on asset allocation prevent banks from taking large risk exposures.

However, since capital requirements may become less effective in booms (when capital ratios increase due to buoyant asset prices), direct quantity restrictions, such as debt-to-income (DTI) or loan-to-value (LTV) ratios, can also be useful complements (see also Borio 2014). These restrictions directly affect the asset side of banks' balance sheets and are meant to limit the fall in lending standards during boom times.

Similarly, capital and stable funding measures are complements in addressing the risk of fire sales, since they focus on vulnerabilities stemming from different sides of a financial institution's balance sheet. The externalities associated with fire sales arise because banks fail to internalise the consequences of not taking precautionary measures in normal times, and thus need to adjust by shedding assets ex post in the event of a negative aggregate shock. Capital and liquidity requirements provide buffers that reduce the risk of fire sales.

Also, capital surcharges can weaken the incentives of banks to become systemic and ensure that they dispose of a larger buffer in case of distress. Complementary restrictions

on the composition of bank assets (as envisioned, for example, by the Volcker rule) serve to limit banks' exposure to excessive risk.

The second result, a corollary, is that since the alternative policy tools are often complementary, there is no 'silver bullet' policy instrument. Since each tool has different advantages and limitations, a combination is likely to provide a better solution to the problem of correcting the same externality. Goodhart et al. (2013) reach similar conclusions using a theoretical model of financial instability.

The third result is that capital surcharges, more than any other tool, can be effective in dealing with any of the externalities. For this reason, and because they are closely linked to microprudential regulation and are part of the Basel III framework, capital requirements (surcharges) are likely to form the core of any macroprudential policy framework. Laeven et al. (2014) verify that capital surcharges are the most effective bank-level instrument for reducing systemic risk. The other instruments can be seen as complements in cases when capital surcharges are less effective.

There are also important areas for further research. Even though the mapping from externalities to policy tools helps identify the pros and cons of alternative policy interventions, a major challenge in the implementation of macroprudential policy rests on the calibration of instruments. Despite recent evidence on the effectiveness of some tools, little is known quantitatively (Dell Ariccia et al. 2012). For example, it is far from clear how high capital surcharges should be, or what the optimal LTV ratio should be. Accordingly, further fundamental and applied research on the optimal choice and calibration of macroprudential policy tools is required to justify policy intervention and avoid regulatory discretion.

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Part IV

European Coordination

A macroprudential policy framework for the EU and its member states

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Macroprudential policies alter regulatory requirements of banks and institutions in response to changes in the macro economy and financial system. This chapter starts by discussing the various objectives of such macroprudential policies and suggests a framework for their application to the EU. The approach reconciles EU-wide financial integration and national frameworks. A great risk for European banking, however, is a potential mismatch between centralisation of protection and decentralisation of supervision.

What is macroprudential policy?

Microprudential policy varies capital requirements and other prudential tools in response to variation in the characteristics of individual banks, including, for example, perceived changes in their asset risk. Macroprudential policy alters regulatory requirements on banks and other financial institutions in response to observed changes related to the financial system as a whole, or to the macroeconomy.

Macroprudential policies can have multiple objectives. One objective is to ensure the resilience of the financial sector of the economy against large common shocks to financial institutions. When many financial institutions experience a large common shock (such as a severe recession, a secular housing price decline, or sovereign default), this can produce large common responses from financial firms (e.g. the liquidation of risky assets, the hoarding of liquidity, the contraction of supply of credit, and the

shutting down of risk-intolerant money markets, including the repo, Libor, Euribor, and commercial paper markets). These responses magnify the initial shock's consequences, potentially resulting in heightened financial distress for the financial sector and the whole economy, and a severe contraction in economic activity. Because individual risk choices can expose the entire financial system and the whole economy to systemic risk, individual firms' risk choices entail potential negative 'externalities'. One goal of macroprudential policy is to internalise those externalities by limiting systemic risk through the imposition of more demanding prudential standards in states of the world where the potential for systemic risk is relatively high (e.g. raising capital requirements during a possible real estate bubble).

A second objective is to control some aspect of the behaviour of the financial sector – for example, the supply of credit – as a means of influencing risk-taking or savings/investment decisions in the whole economy. For instance, rapid aggregate credit growth can be associated with a deterioration in the quality of underwriting, and may fuel unsustainable asset-price inflation and produce misallocations of investments. Containing aggregate credit growth may, therefore, stabilise and increase consumption, investment, and asset returns over time.

Finally, a third objective of macroprudential policy is to improve the safety and soundness of individual banks with respect to non-correlated shocks. Here, the purpose of macroprudential regulation is to correct aggregate common errors in the measurement of bank risk used by microprudential regulation. For example, if risk weights used by banks under the Basel rules tend to become too generous in some states of the world, increasing capital requirements in those circumstances can be justified as a corrective policy. Furthermore, these corrective macroprudential policies can prevent distortions in investment, especially during periods of economic booms, when the under-appreciation of risk in certain sectors, such as commercial real estate, may prompt overinvestment.

We note that these three objectives of macroprudential policy may conflict with short-term policy goals associated with maintaining growth in the economy. It is almost

never wise, however, to tolerate permissive underwriting standards and excessive risk-taking myopically in the interest of propping up short-term growth. By focusing on the medium- and long-term benefits of financial stability, macroprudential policy produces a lasting reduction in short-term economic volatility.

To what sort of information should macro-prudential policies respond, and how should they respond?

There are two broad categories of information that could be relevant for macroprudential policy, which we label "aggregate indicators", and "financial network indicators".

Aggregate indicators include the growth of stock market prices, the growth of house prices, the growth of total bank credit, the leverage of banks (evaluated using book values and market values), the leverage of non-financial corporations, the sectoral concentration of risk in lending, the implied volatility of non-financial stocks, the implied volatility of bank stocks, the size of haircuts applied to collateral in financial markets, term spreads or risk spreads in the bond markets, GDP growth rates, and growth rates of investment or of other components of GDP.

Financial network indicators measure the robustness of the financial system in dealing with a shock. Concentrations of counterparty risk at important 'nodes' in the financial network can indicate systemic vulnerability, even if aggregate indicators do not indicate any expansion of risk. Correlations in positions across important intermediaries can result in 'cascade effects' whereby significant losses produce widespread simultaneous selling pressure or illiquidity for more than one important institution.

Macroprudential policy can respond to aggregate indicators by establishing algorithms that translate changes in the indicators into changes in capital requirements, liquidity requirements, or other prudential policies. For example, under Basel III, changes in the ratio of credit to GDP are one of the key variables that will be employed to measure systemic vulnerability to credit booms. Work by Claudio Borio and Mathias Drehman (2008) has argued in favour of a dual threshold criterion whereby capital requirements

could respond to a sufficiently large combined change in the growth of credit and the growth of either stock prices or house prices. Others, like the Squam Lake Group, have suggested including leverage in the mix of aggregate indicators.

It is realistic to think that a rule could be established through which regulatory capital requirements and other requirements would vary in response to observed changes in some vector of aggregate measures, in a way that would be predictable and transparent. *Transparency* and *predictability* are desirable features of a rule for two reasons. First, they would ensure accountability of policymakers, who might otherwise face momentary political pressures not to apply a desirable rule. Second, by making policy predictable, the market will reinforce policy actions in ways that will make macroprudential policy more powerful. For example, assume that a credit-to-GDP trigger is about to be breached. Knowing that this will result in higher minimum capital ratio requirements, banks may begin to cool credit in expectation of those higher capital requirements, which would itself contribute to the desired stabilisation in credit growth.

At the same time, there can be costs to excessively rigid adherence to rules. Sometimes policymakers will have access to information that would justify a deviation from pre-announced rules. Adherence to rules can be made appropriately flexible by instituting a 'comply or explain' regime. Occasionally, when the need to deviate from the rule is sufficiently great, policymakers will do so and then explain in detail – and promptly – the information and the policy rationale that led them to fail to comply with the rule.

Financial network indicators are not as useful for purposes of 'real-time' counter-cyclical policy, for three reasons. First, correlations, counterparty positions, and other measures of network vulnerability are not reliable as real-time measures; they are subject to dramatic and sudden change. Second, the mapping from changes in such indicators to regulatory changes is hard to calibrate. Third, it would be almost impossible to construct a predictable and transparent rule to determine how measures of network vulnerability would translate into variation in capital requirements.

For these reasons, we believe that only aggregate indicators are suitable for use in real-time variation of regulatory requirements in response to cyclical variation in asset and credit markets. Financial network indicators should be used for other purposes. In particular, financial network indicators can be used an inputs to gauge the appropriate long-term levels of regulatory requirements, particularly with respect to systemically important financial institutions.

We propose that different regulatory or central bank tools should be applied to different purposes. This specialisation and division of responsibility would enhance accountability and transparency, and thus increase effectiveness.

- Interest rates set by monetary authorities should follow clear (not necessarily rigid) rules – like a Taylor Rule, a nominal GDP-targeting rule, or an inflation-targeting rule.
- Cyclical variation in macroprudential policy should respond predictably to a set of aggregate indicators.
- Periodic stress tests should re-calibrate long-term capital requirements and liquidity requirements in a manner than takes into account financial network effects and changes over time in asset risk. Note that current regulatory stress-test frameworks (both in the US and Europe) do not account for the network-related 'second-round' effects, though they do potentially account for changes over time in asset risk (through asset-specific loss estimates).
- We also endorse, as an additional regulatory tool, the use of additional asset- and liability-failsafe measures, such as timely revisions of sectoral weights (as was done in the UK recently for commercial real estate and in India for mortgages in 2006-07), and caps on loan-to-value (LTV) or debt-to-income (DTI) ratios. These would be applied to lines of business or specific subsidiaries to ensure adequacy of capital and liquidity from a bottom-up perspective, and thus reduce the reliance on overarching modelling of enterprise-wide risk, which is currently relied upon excessively (Acharya et al. 2011; Acharya and Oncu 2013).

To what extent should capital versus liquidity requirements be used as macroprudential tools, and how?

Basel III adds two new proposed liquidity requirements to the existing set of capital requirements. There are several flaws in the Basel conception of these requirements. Liquidity is defined far too broadly; it would be more appropriate to focus on cash requirements. Furthermore, requirements for cash and capital should recognise the substitutability of the two instruments for controlling risk. Finally, the Basel III conception of the motivation for liquidity requirements is too narrowly targeted towards limiting liquidity risk. In fact, both capital and liquid assets (especially cash held at the central bank) are essential tools for managing banks' default risk. As such, liquidity requirements have significant advantages over capital, and in general an optimal prudential regulatory system should combine capital and cash reserve requirements as prudential tools. Cash at the central bank is real, while book capital is an accounting fiction that is subject to manipulation by banks and their regulators. Furthermore, as Calomiris et al. (2014) show, significant required cash holdings raise the lower bound of the value of bank assets, which reduces banks' incentives to undertake excessive risk in the wake of losses (so-called 'resurrection risk-taking').

Over the cycle, capital requirements are a more effective tool for varying prudential requirements than cash requirements. Because of the favourable incentive consequences of maintaining cash requirements during recessions or times of slow growth, it is better to reduce capital requirements in low-growth states and raise them during high-growth states.

Furthermore, capital requirements should be redesigned to include the use of *market* information about bank stock or bond values, in addition to book values, in prudential regulation. The use of market information about bank stock and bond values would be useful for informing regulatory interventions and preventing the gross understatement of asset losses and overstatement of bank equity values. Some market participants may complain that market values may understate 'true value', but counterparty risk is a direct

consequence of market perceptions of value. Furthermore, governments may be forced to intervene in response to the collapse of market values. That means that regulators who are concerned about the collapse of interbank markets, or banks, must focus on market indicators of bank capital and risk. The role of the market value of capital could be particularly useful for macro-prudential regulation (see Box 1). Specifically, measures of bank leverage based on market values could be used as triggers to vary bank capital requirements, or as triggers in a new contingent capital (CoCo) requirement to prevent banks from becoming sources of systemic risk. Calomiris and Herring (2013) argue, for example, that establishing a CoCo requirement with a market-value trigger set at a high ratio could incentivise banks to voluntarily maintain high minimum ratios of capital and avoid situations like 2006-08, when banks were permitted to run down their true capital ratios with disastrous consequences.

Other examples from KMV's successful ratings of debts, both in the case of Enron of WorldCom, indicate that changes in market values of equity provide essential and timely indicators of changing financial circumstances. Finally, market-value of equity-based measures that capture downside aggregate risk or systemic risk of financial firms such as CoVaR (Adrian and Brunnermeier 2009) and Marginal Expected Shortfall and Capital Shortfall (Acharya et al. 2010, 2012) also may be promising to incorporate into stress tests.

Box 1 The usefulness of market equity ratios for identifying bank risk, April 2006-April 2010

For three sets of institutions – troubled European financial institutions, troubled US financial institutions, and non-troubled US financial institutions – we plot the backward-looking 90-day moving average of the ratio of the value of the market value of equity relative to the sum of the face value of debt plus the market value of equity. For the first two groups, the market equity ratio declined dramatically over the 18 months prior to the crisis of September 2008. For the third group,

equity ratios declined much less and remained high. Clearly, market perceptions of weakness were quite relevant for identifying relatively weak financial institutions during this period.

Figure 1a Troubled European financial institutions during the crisis

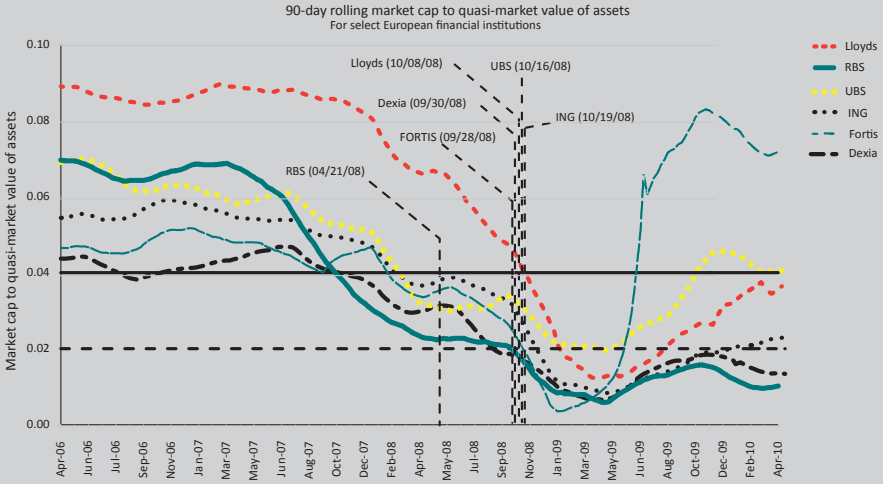


Figure 1b Troubled US financial institutions during the crisis

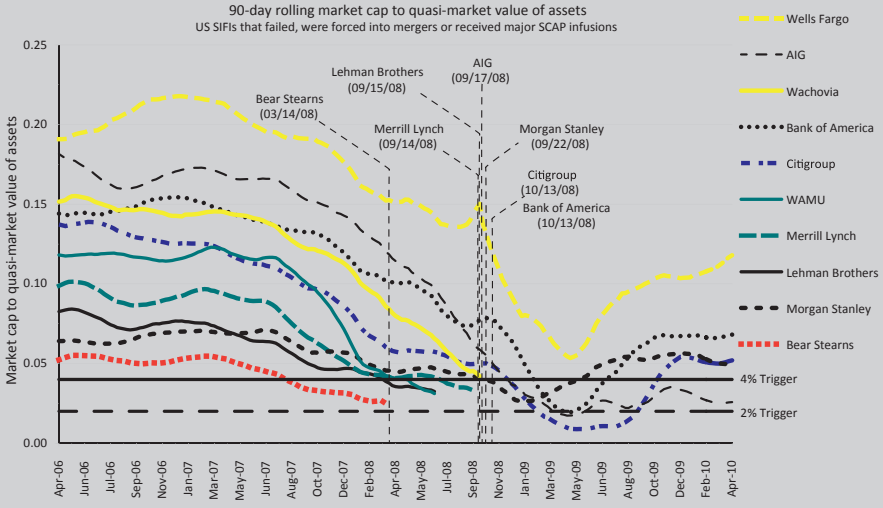
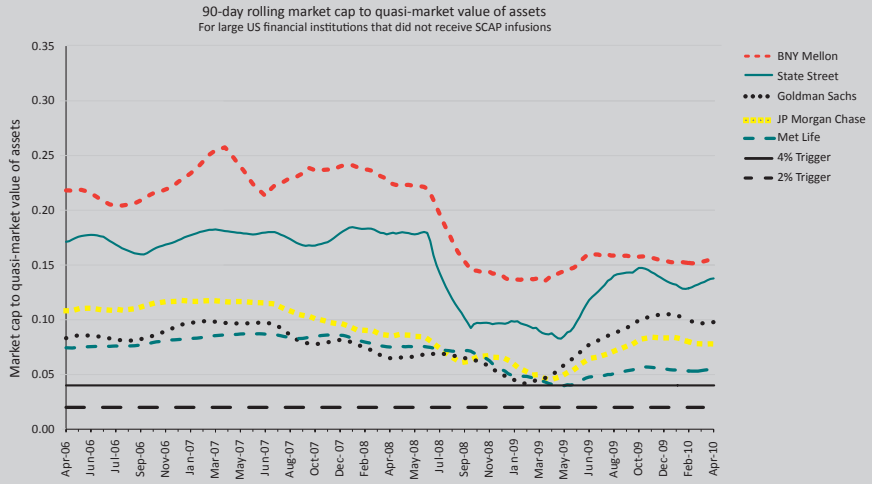


Figure 1c Non-troubled US financial institutions during the crisis



Source: Calomiris and Herring (2013).

Applying this general framework to the EU

In Europe, the macroprudential policy framework operates on two levels. At the EU level, the European Systemic Risk Board (ESRB) has a legal responsibility for systemic oversight and the prevention and mitigation of systemic risks to the EU financial system, although it possesses neither macroprudential instruments nor the power to use other authorities' instruments. At the Eurozone level, the ECB has been granted new authority with respect to supervision and stress testing, but even here, that authority is shared with national regulators. There are two reasons why the responsibility for the adoption of the measures necessary to maintain financial stability – either upon the initiative of the national macroprudential authority or as follow-up to ESRB recommendations and warnings – remains largely national within Europe.

One reason is that the structural characteristics of economies and financial systems still differ greatly among EU countries in spite of EU financial integration, as the recent divergent growth experiences within Europe over the past decade illustrate (see Box 2). Thus it may make sense for different countries to operate somewhat distinct macro-

prudential policies to control the timing of aggregate credit expansion and contraction within their borders.

Box 2 Divergent growth within Europe

The figures below show the annual GDP growth in core Eurozone countries (Belgium, Germany, France, Netherlands and Austria) in panel a, and in the peripheral or GIIPS countries (Greece, Ireland, Italy, Spain and Portugal) in panel b, for the time period 2003 to 2013. As the figures show, core countries still exhibited mainly positive growth in 2008, while in 2009, GDP dropped significantly by -2.8% to -5.1%. From 2010, growth rates started recovering, albeit still being weak. In contrast, the downturn for the periphery states started earlier, with all but Spain already exhibiting negative growth rates by 2008. The drop in 2009 was slightly stronger than for the core countries. Since then, the periphery states with the exception of Ireland have failed to recover in their growth rates compared to the core states. In particular Greece reached markedly negative levels between 2010 and 2013. The figures underscore the economic divergence in the European countries since 2008.

Figure 2a GDP growth in core countries

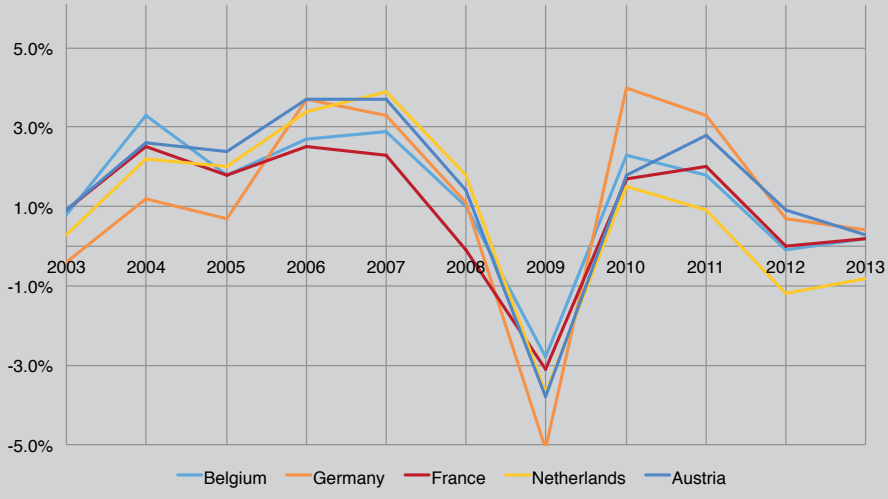
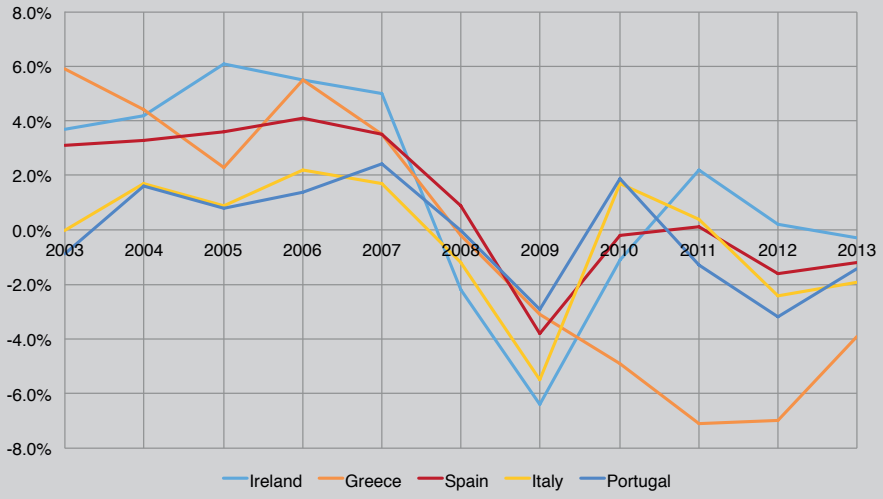


Figure 2b GDP growth in GIIPS



Source : Eurostat.

The other reason is political influences that favour preserving national authority over the economy and financial sector resolution policy. Decisions to bailout banks or impose discipline on them have important national economic and political consequences. For example, financial crises typically have a substantial impact on public finances, the responsibility for which lies at the national level in the absence of an 'EU taxpayer'.

However, the continuing decentralisation of regulatory authority, including macroprudential policymaking, entails significant risks. In particular, the recognition of losses in a predictable and transparent manner, and their allocation across the various national authorities or financial institutions, inherently requires coordination and agreement among national authorities. Postponing such agreement is a formula for producing chaotic resolution and failing to establish an incentive-compatible resolution policy.

This risk of negative externalities across countries when loss-sharing rules have not been established arises in particular with respect to macroprudential policies. Indeed,

the ability of countries to pursue distinct macroprudential policies can only work effectively if there is a pre-arranged coordination of resolution costs.

The recognition of the need for coordination has produced a recent agreement within the EU to apply similar time-varying capital requirement policies to the foreign branches of banks operating within a host country but regulated by the parent bank's country. Recent evidence in Aiyar et al. (2014a, 2014b) confirms the desirability of this coordination. They show that absent such coordination, foreign branches can be an important source of 'leakage' in macroprudential policy. Foreign-headquartered branches operating in the UK substantially offset (by about one-third) the effects of capital requirement changes on the aggregate supply of credit. Under the new arrangements, all EU-based institutions with branches outside their home country will now be subject to the macroprudential policy changes that are imposed in the countries where their branches operate. This reciprocity has been agreed up to an adjustment of 2.5 percentages points.

Only through the ex ante coordination of loss-sharing across countries can countries be protected from the fiscal implications of each other's differing regulatory policies, including differences in forbearance. Ideally, the EU will move towards a coherent regional approach to resolution policy and the recognition and allocation of loss. In the meantime, some form of clear agreement among countries that allocates losses according to some established rules is necessary as an accompaniment to a fragmented political reality.

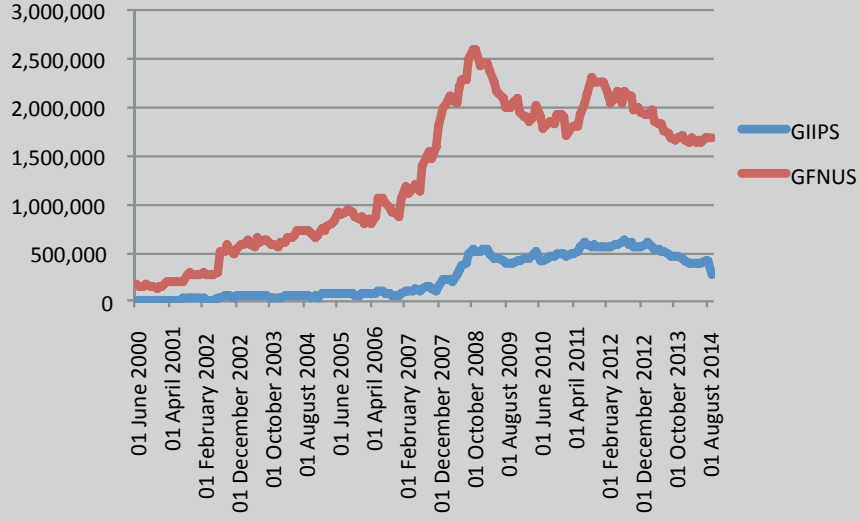
The need for coordination among countries is especially acute in the Eurozone. In 2011, the absence of area-wide financial supervision and crisis resolution mechanisms led to severe risks to the stability of the financial system stemming from negative feedback effects between national sovereign and banking sector risks. This experience led to increased policy integration in the Eurozone, under the auspices of the ECB. But this new authority still falls short of a full-fledged banking union, with fully centralised supervision and regulation, and resolutions funded by fiscal agreements to allocate any losses covered by taxpayers (see Marzinotto et al. 2011). The systemic financial

risks associated with the failure to enforce sufficient prudential capital requirements is apparent in Box 3, which uses market information (stock prices and measures of

Box 3 Diverging systemic risks

The figures below show the divergence in forward-looking measures of systemic risk contribution (or 'vulnerability to a crisis') based on the SRISK measure between the peripheral European countries (GIIPS: Greece, Ireland, Italy, Spain and Portugal) and core European countries (GFNUS: Germany, France, Netherlands, the UK and Switzerland). SRISK measures the market equity capital shortfall of a financial firm relative to a prudential benchmark (5.5% of book liabilities) in a future adverse scenario, which is a 40% collapse in the global stock market, and relies on an assessment of the downside risk of market equity of a firm in such an adverse scenario (for details, see Acharya et al. 2012). SRISK as plotted is aggregated for each group of countries based on market equity capital weighting for financial firms in each group.

Figure 3 SRISK: GIIPS versus GFNUS



Source: NYU Stern School of Business Volatility Lab (vlab.stern.nyu.edu/welcome/risk).

As the figure shows, SRISK for both GIIPS and GFNUS countries rose sharply from 2007, reaching a peak in late 2008/early 2009. For GFNUS countries, the subsequent peak in late 2011 is below the first peak. In contrast, for GIIPS countries, the peak in 2011-12 is as high as (in fact, slightly higher than) in 2008-09, highlighting that GIIPS countries had a banking crisis (intertwined with a sovereign risk crisis) in 2011-12 that was as worse as the banking crisis (due to housing and mortgage risks) in 2008-09, and that this vulnerability was reflected in market-equity-based capital shortfall estimates for financial firms in these countries.

bank risk exposures to the market) to gauge the leverage and systemic risk (SRISK) of European banks.

To summarise, the proposed two-level framework within Europe can be seen as a way to reconcile two logics: one of financial integration, which calls for an EU-wide framework; and one of economic and political conditions, with national financial cycles and national taxpayers, which calls for national frameworks. However, to pursue beneficial micro- and macroprudential policies, as well as timely and effective resolutions, there is a need for adequate coordination on ex post loss-sharing as well as ex ante macroprudential arrangements with respect to stress in EU-wide financial firms and markets. Such coordination, in turn, necessitates that the critical macroprudential tools outlined in this chapter be applied at the level of the banking union, or with a legally authorised directive from the banking union to the national authorities. One of the greatest risks attendant to European banking is the potential mismatch between the centralisation of protection and the decentralisation of supervision and resolution authority; such a mismatch creates a fiscal free-rider problem that could exacerbate undesirable regulatory forbearance.

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Europe's macroprudential policy framework in light of the banking union

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The European regulatory landscape has changed profoundly in the wake of the Crisis. This chapter presents two of the main supervisory innovations: the European Systemic Risk Board (ESRB) and the Single Supervisory Mechanism (SSM). The way macroprudential regulation is organised within each and the consequences of the creation of the SSM for the ESRB are also examined.

Introduction

It is a truism that the European regulatory and supervisory landscape has profoundly changed in the wake of the financial crisis. Among the many innovations, two are the subject of this chapter.

One was the creation in December 2010 of the European Systemic Risk Board (ESRB), an EU body tasked with responsibility "for the macroprudential oversight of the financial system within the Union in order to contribute to the prevention or mitigation of systemic risks to financial stability in the Union that arise from developments within

1 The author is currently vice-chair of the Advisory Scientific Committee (ASC) of the European Systemic Risk Board (ESRB). He was serving as chair when the ASC issued its Report No. 3/September 2013 entitled "The consequences of the Single Supervisory Mechanism for Europe's Macro-Prudential Policy Framework" on which this chapter draws extensively. He is grateful to his ASC colleagues (especially Viral Acharya, Charles Calomiris, Martin Hellwig, Marco Pagano and Dirk Schoenmaker) for their contribution to the ASC report.

the financial system and taking into account macro-economic developments, so as to avoid periods of widespread financial distress".[2]

The European macroprudential policy framework operates at two levels. At the EU level, the ESRB can issue warnings and recommendations, which are subject to a 'comply or explain' mechanism. It also has consultative powers in a broad set of areas. However, the ESRB does not have the power to use other instruments directly. Until recently, that responsibility lay basically at the national level, but was subject to EU constraints that prohibited the loosening of microprudential ratios.

There were two reasons why the responsibility for the adoption of macroprudential measures – taken either upon the initiative of national macroprudential authorities or in response to ESRB recommendations and warnings – was primarily vested in national rather than EU authorities when the ESRB was set up.

One reason was inherently macroprudential in nature. Financial and macroeconomic cycles, and the structural characteristics of financial systems, still differ a great deal across EU countries despite EU financial integration. The divergent economic conditions within Europe over the past decade illustrate these potential differences. Thus it may make sense for different countries to operate somewhat distinct macroprudential policies to control the timing of aggregate credit expansion and contraction within their borders. Even in the Eurozone, where financial markets are more integrated than in the EU as a whole, a one-size-fits-all approach to macroprudential policy – which would pretend that economies are all experiencing synchronised changes in credit market, asset market, and growth conditions – is generally undesirable.

The other reason was the political economy of financial sector supervision and resolution in Europe. Until recently, despite the increasing integration of EU financial markets,

2 Regulation (EU) No 1092/2010 of the European Parliament and of the Council of 24/11/2010 on EU macroprudential oversight of the financial system and establishing a European Systemic Risk Board. The regulation entered into force on 16 December 2010.

national authorities still retained full and sole control over financial supervision and crisis resolution. This was mainly due to the fact that financial crises typically have a substantial impact on public finances, the responsibility for which lay at the national level in the absence of a European mechanism funded through its own resources.

The decentralisation of regulatory and supervisory authority, including macroprudential policymaking, entailed significant risks that were not addressed when the ESRB was created. The recognition of losses in a predictable and transparent manner, and their allocation across the various national authorities or financial institutions in the context of cross-border resolution, inherently requires coordination and agreement among national authorities. Postponing both such agreement and the creation of a European resolution mechanism was a formula that led to the costly delaying of bank resolution otherwise necessary due to the financial crisis.

It is here that the other innovation to the European regulatory and supervisory landscape comes in. The European banking union, first floated as an idea in 2011-12 and now partially implemented,[3] offers the prospect of solving the coordination problem by putting in place, on top of national supervisors and national resolution authorities, a single supervisory mechanism (SSM), where responsibility for supervising financial institutions is exercised by the ECB, and a single resolution mechanism (SRM) consisting of the single resolution board – the European resolution authority – and a single resolution fund.

The SSM was launched on 4 November 2014 and around 150 banks are now supervised directly by the ECB, representing approximately 80% of bank assets in the countries participating in the mechanism, which at the moment comprises only those EU members belonging to the Eurozone. All other banks in the SSM (over 6,000 in the Eurozone

3 For an early contribution on what the European banking union should look like, see Pisani-Ferry et al. (2012). The initial Commission proposal was critically analysed by the ASC in September 2012 (see Sapir et al. 2012).

alone) continue to be supervised by their national supervisor, although the ECB retains final supervisory authority over these banks.

So far, most of the academic and policy discussion regarding the SSM has concentrated on microprudential issues, which are the most pressing ones at this initial stage. However, and this is not always appreciated or understood by those outside a very small circle, the regulation creating the SSM also confers on the ECB specific responsibility over macroprudential policy.[4]

The remainder of this chapter is divided into two sections. The first examines how macroprudential policy will be organised inside the SSM. The second looks at the implications of the SSM for the role of the ESRB as the EU body responsible for identifying, monitoring and mitigating systemic risks to the stability of the EU financial system.

Macroprudential policy inside the SSM

The SSM has extensive powers over both micro- and macroprudential policies, but with different divisions of responsibility between the ECB and the relevant national authorities in the two areas. This section addresses two questions about the organisation of macroprudential policy inside the SSM: What should be the division of responsibility between the ECB and the national authorities in the conduct of macroprudential policy? What should be the relationship between macro- and microprudential policies?

In principle, two models for the division of responsibility were feasible. In a *decentralised* model, the ECB would set the macroprudential framework (including the overall design of the policy strategy for how to use macroprudential tools) and the national authorities would apply the tools in their respective countries.

4 Council regulation (EU) No 1024/2013 of 15/10/2013 conferring specific tasks on the ECB concerning policies relating to the prudential supervision of credit institutions.

In a *centralised* model, the ECB would not only set the macroprudential framework, but also directly apply the macroprudential tools in cooperation with the national authorities. The main task of national authorities would be to provide information about their national business/housing cycle conditions and to make a recommendation to the ECB, which would take the final decision.

The model chosen by the regulation is a hybrid of the centralised and decentralised models. The main responsibility for macroprudential measures lies with the national authorities, but paragraph 2 of Article 5 of the regulation specifies that "[t]he ECB may, if deemed necessary, instead of the national competent authorities or national designated authorities of the participating Member State, apply higher requirements for capital buffers than applied by the national competent authorities or national designated authorities".

It should be emphasised, however, that the ECB powers only apply to macroprudential tools that are provided for in relevant acts of Union law, in particular CRR and CRD IV. Those that are not provided for in such acts cannot, by definition, be conferred on the ECB by the SSM regulation and will therefore remain entirely under the responsibility of national authorities. In addition, the SSM may only apply instruments related to the banking sector. Hence even the centralised model could only be partially centralised.

In general, the centralised model should not imply a uniform application of the macroprudential tools across the countries in the SSM, since they would be expected to face different business or housing cycles. However, in some instances, the ECB may wish to apply (or to encourage national authorities to set) a uniform macroprudential requirement when a particular asset is increasing too fast in many SSM countries.

With regards to the question about the relationship between macro- and microprudential policies, one should note that there is often a trade-off between the two policies. A good rule of thumb is to give priority to macroprudential concerns when a conflict arises.

This has implications for the organisation of macro- and microprudential policies within the ECB. In particular, it raises the question of whether the same body within the ECB should be in charge of both policies. The planning and execution of supervisory tasks by the ECB is conducted by the SSM's Supervisory Board composed of a chair, a vice-chair (chosen among the members of the Executive Board of the ECB), four representatives of the ECB and one representative of each country participating in the SSM. Decisions by the Supervisory Board will need to be validated by the Governing Council of the ECB.

In principle, there were two options for the organisation of micro- and macroprudential decisions within the ECB.

One option was to give the Supervisory Board responsibility for preparing both micro- and macroprudential decisions, which would then need to be validated by the Governing Council. There are advantages with this approach in terms of coherence, but there is also a major drawback. Since discussions in the Supervisory Board are likely to be dominated by micro-supervisory issues about individual banks, this body would risk giving too little weight to macroprudential considerations.

The other option was to have more active involvement of the Governing Council in macroprudential decisions. In the limit, one could have imagined a situation where, on the one hand, microprudential decisions are prepared by the Supervisory Board (whose members are primarily financial supervisors dealing with micro risks) and subject to validation by the Governing Council, while, on the other hand, macroprudential decisions are entirely discussed and decided by the Governing Council (whose members are central bankers who deal mainly with macro risks). This option is preferable because it gives greater weight to macroprudential considerations. It is comforting therefore that something close to this option has been chosen, albeit a less extreme version since the Supervisory Body will also play a (subordinated) role in macroprudential decisions.

The role of the ESRB in the new European macroprudential policy framework

What are the consequences of the creation of the SSM for the ESRB? The answer depends on the perspective one adopts. On the one hand, one could insist on the fact that the ESRB's remit is both broader and narrower than that of the ECB. It is broader since the ESRB covers the entire EU and the entire spectrum of financial activities whereas the SSM only covers participating countries and is restricted to banking activities; and it is narrower since it covers only macroprudential oversight whereas the SSM covers both micro- and macroprudential supervision, which means that the ESRB is more specialised than the SSM. Viewed in this perspective, one could conclude that there is little overlap between the ESRB and the SSM; they have a different coverage and specialisation. Hence the creation of the SSM would have little consequence for the ESRB other than at the organisational level since the ECB, which has played an important role in the ESRB, will perform the central role in the SSM.

On the other hand, one could argue that most EU countries will participate in the SSM and that banking is not just one activity, but the most important financial activity in terms of systemic risk to the stability of the financial system. Moreover, since it will have powers over both micro- and macroprudential supervision, the ECB will be able to directly implement macroprudential policy rather than simply making recommendations or issuing warnings, as is the case for the ESRB. Viewed in this perspective, one could conclude that not only is there a lot of overlap between the ESRB and the SSM, but also the ECB will have far greater powers in macroprudential policy than the ESRB. Hence the creation of the SSM, in which the ECB will play the central role, would essentially render the ESRB irrelevant.

The best perspective is probably to adopt a middle course combining elements of both views. The starting point should be that the ESRB is, indeed, the only EU-wide body in charge of macroprudential supervision, that it covers all financial activities rather than only banking, and that its only instruments are recommendations and warnings.

The more controversial question concerns the role of the ESRB in identifying, monitoring and issuing recommendations or warnings about systemic risks to the stability of the EU financial system that stem from developments in individual countries, especially when such countries belong to the SSM and when the risks pertain to the banking sector.

Should the ESRB have the effective capability to issue recommendations or warnings about developments in individual EU countries, including those in the SSM? The answer is yes, the ESRB should have such capability and it should apply equally to all countries, whether or not they belong to the SSM. An ESRB that could only issue recommendations and warnings to the few countries expected to remain outside the SSM would effectively have no power at all.

The reason why the ESRB should have such capability is that it is the sole EU body with the power to prevent insufficient action on the part of national authorities – and on the part of the ECB for the SSM countries – in mitigating systemic risk to the EU financial system. The fact that it has only soft, rather than hard, power does not detract from its power. On the contrary, it is precisely because the ESRB does not carry a big stick that it should speak loudly about the dangers of inaction in the face of mounting systemic risks.

How should the ESRB exercise its powers towards SSM countries in issuing recommendations or warnings? As a rule, the ESRB should probably address its country-specific recommendations or warnings to both the ECB and the relevant national authorities. As far as macroprudential tools that are not provided for in relevant acts of Union law are concerned, recommendations or warnings will always be addressed to the national authorities since, by definition, the SSM has no power here.

The fact that the ECB will become a potential addressee of ESRB recommendations and warnings raises a potential conflict of interest between the ECB and the ESRB. Such a conflict could arise due to the central role of the ECB within the ESRB, and in particular due to the fact that the ECB president also serves as the ESRB chair.

Finally, a more active role by the ESRB in identifying, monitoring and making recommendations or warnings about systemic risks to the stability of the EU financial system stemming from developments in individual countries necessitates some changes to the ESRB's governance. In particular, the creation of a post of managing director, who would act as the ESRB's chief executive officer, should be envisaged. The MD would carry out the policy determined by the General Board of the ESRB and be responsible to the General Board for the management of the ESRB.

Having an MD would help resolve two problems with the ESRB. The first is the interplay with the Economic and Financial Committee (EFC), which should be improved. This is important since the EFC prepares the work of the ECOFIN Council and since finance ministers need to be alerted of potential systemic risks by an advocate of macro-financial stability. The second is the issue of identity of the ESRB, which needs to be reinforced to avoid possible conflicts of interest with the ECB now that the SSM has been established.

As part of its mandate, the European Commission recently assessed the performance of the ESRB since its creation in 2010. It refrained from making proposals for possible changes in its mission and/or organisation on the grounds that it was too early to take into account important changes in the European regulatory and supervisory landscape, in particular the creation of the European banking union.[5] However, it is expected that the Commission will make legislative proposals in the course of 2015. Hopefully they will further reinforce the European capacity in "the prevention or mitigation of systemic risks to financial stability in the Union that arise from developments within the financial system and taking into account macro-economic developments, so as to avoid periods of widespread financial distress".

5 Report from the Commission of the European Parliament and the Council on the mission and organisation of the ESRB, COM(2014) 508 final, Brussels, 8 August 2014.

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Global interest rates have been extraordinarily low since the Global Financial Crisis. This recession-fighting monetary policy, however, may be inflating financial bubbles. Macroprudentialism is the policy that many central banks are using to reduce the chances that today's low-for-long rates are sowing the seeds of future crises.

Macroprudentialism, however, involves a set of relatively untested policies. Things as basic as the precise objective of macroprudential frameworks and their interactions with monetary policy and microprudential supervision are still not clear.

This eBook collects the thinking on macroprudentialism from a broad range of leading US and European economists. The authors come to a consensus on the broad objectives of macroprudential supervision, but important disagreements remain.

- Some authors view macroprudentialism as a tool to increase resilience against financial shocks, while others believe it should strive to dampen the credit cycle.
- Authors also disagreed on how closely monetary and macroprudential policies should be coordinated.
- There are also calls to expand macroprudentialism beyond the current banking scope to securities, insurance and pensions. The ultimate goal is to look with a macro lens to prudential rules.

Agreement was found on the need for coordination of macroprudentialism in the Eurozone's new Monetary and Banking Union, with the ECB playing a strong role.

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