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Macroprudential Policy: The Need for a Coherent Policy Framework

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Abstract

The recent literature on macroprudential policy contains several suggestions for possible instruments. This paper puts forward and implements a method for arriving at a coherent policy framework. It starts by defining the role of macroprudential policy in the overall policy framework for the monetary and financial system. It then specifies the objective, intermediate targets (pillars), instruments, decision-making, accountability, and the legal base. We introduce a two pillar strategy. The basic presumption is that each instrument should be related to its intermediate target (pillar). This allows us to select a limited set of core instruments aimed at stabilising financial imbalances (pillar 1) and addressing externalities that arise from interconnections in the financial system (pillar 2).

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1. Introduction

The global financial crisis has highlighted the need for managing the stability of the financial system as a whole. To do that, macroprudential policy mandates are being introduced across the world. However, a coherent policy framework has not yet been developed.

Several academic (e.g. Brunnermeier *et al*, 2009; Hanson, Kashyap and Stein, 2011; Kashyap, Berner and Goodhart, 2011; Shin, 2010) and policy (e.g. BIS, 2010a; IMF, 2011; FSB, IMF and BIS, 2011) papers on macroprudential policy have emerged over the last two years. These papers have inspired thinking on new macroprudential concepts, which is much needed. The aim of this paper is to make macroprudential policy operational by developing a coherent framework. There is also a need to place macroprudential policy within the overall policy framework for the monetary and financial system. In that way, the interrelations between the different policy objectives can be analysed.

So, this policy paper puts forward a concrete proposal for an integrated macroprudential policy framework. We start from the basic characteristics of a coherent policy framework: the objective, intermediate targets (pillars), instruments, decision-making, accountability, and legal base.

We start from the time series and cross section dimensions of risks to financial stability (Borio and Crockett, 2000). We then separate macroprudential policy into a cyclical part and a structural part. The first pillar, or intermediate target, is related to financial imbalances (credit and liquidity cycles). The aim is to prevent or mitigate financial imbalances building up. The second pillar is related to externalities arising from interconnections (both direct and indirect) within the financial system. The aim is to foster the resilience of the financial system to withstand shocks.

On instruments, there are several suggestions. Our framework confines itself to the main instrument on which consensus is emerging in the literature. Our main point is that each instrument should be related to its intermediate target. Only in that way, we can measure whether the instrument is having its desired impact. The framework retains the flexibility to add other instruments at a later stage, if evidence points at doing so.

On the institutional front, several financial stability committees, such as the European Systemic Risk Board and the US Financial Stability Oversight Council, have been established. These committees are useful to discuss financial stability developments and to dovetail the different policies (monetary, macroprudential and microprudential). But committees tend to be less effective in timely decision-making. We propose to give final responsibility for macroprudential policy to central banks. That would reinforce their dual responsibility for price and financial stability (Goodhart, 2010).

The rest of this paper is organised as follows. Section 2 puts the macroprudential policy objective in an overall policy framework and summarises the current discussion on macroprudential policy. Section 3 investigates the nature of cyclical policy versus structural policy. Section 4 discusses the institutional setting and the role of central banks. On this basis, section 5 defines the macroprudential policy framework. The basic characteristics, as mentioned, are specified. Section 6 concludes.

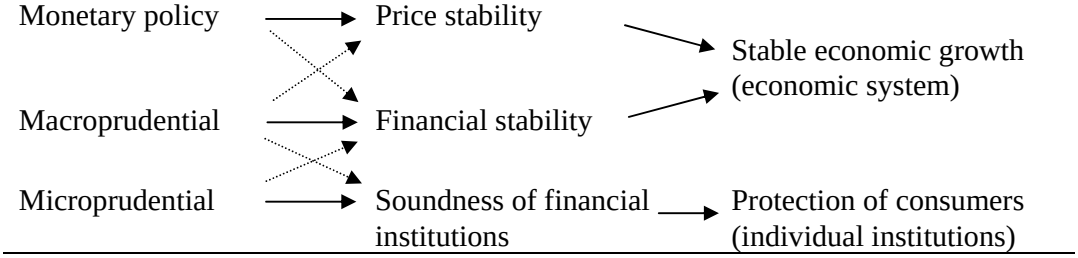
2. The objective of macroprudential policy

2.1 Overall policy framework

Until recently the broader financial system was steered by a combination of monetary policy and microprudential regulation. The objective of monetary policy is to stabilise prices in the economy and thus to foster economic growth, while microprudential regulation is aimed at the stability of individual institutions to protect consumers (depositors/policyholders). The recent global financial crisis has shown that the stability of the financial system can fall between the policy cracks. Financial imbalances can thus be building up without being mitigated. The aim of macroprudential policy is to fill this void.

Tinbergen (1952), the first winner of the Nobel prize for economics, argued that you need at least one independent policy instrument for each policy objective. In practice, the different policy tools and objectives are interrelated. Figure 1 illustrates the overall policy framework for the monetary and financial system.[1] To keep it simple, each policy has a primary impact on its direct objective and a secondary impact on the objective(s) next to it. The solid lines in figure 1 illustrate the primary impact and the dotted lines the secondary impact.

Figure 1. Overall policy framework for monetary and financial system



Source: Schoenmaker (2010)

Discussions about policy frameworks often assume that these three policy areas can all be separated, and that instruments used to promote one objective do not undermine the other. Until recently, the prevalent approach to financial stability has implicitly assumed that the system as a whole can be made safe by making individual financial institutions safe. But this is wrong. As indicated below, this represents a fallacy of composition. It is more appropriate to think in terms of a hierarchy of objectives (Kremers and Schoenmaker, 2010). The first two objectives, price and financial stability, are equally important and affect the economy at large. The latter objective, sound financial institutions, addresses individual financial institutions and aims to protect individual consumers. The first two objectives aimed at the 'system' are more important than the latter objective aimed at 'individuals', for the simple reason that when the system goes down its individual components will go down as well. Moreover, the stability of the financial system is more important than the soundness of its

[1] This paper is confined to the prudential side of financial regulation. In a broader monetary and supervisory framework, Kremers and Schoenmaker (2010) include a fourth policy of conduct of business aimed at orderly markets and fair treatment of consumers. Like microprudential supervision, conduct of business supervision has an impact on individual institutions.

individual components. In a market driven economy, firms – including financial firms – should be allowed to fail to contain moral hazard, unless there is a systemic threat.

The fallacy of composition (Brunnermeier *et al*, 2009) concerns the idea, fundamentally at the basis of original Basel banking supervision, that to safeguard the system it suffices to safeguard the components. But in trying to make themselves safer, financial institutions can behave in a way that collectively undermines the system. Selling an asset when the price of risk increases may be a prudent response from the perspective of an individual bank. But if many banks act in this way, the asset price will collapse, forcing financial institutions to take yet further steps to rectify the situation. The responses of the banks themselves to such pressures lead to generalised declines in asset prices, and enhanced correlations and volatility in asset markets. The micro policies can thus be destructive at the macro level.

Macro- and microprudential policies have distinct objectives and therefore distinct perspectives (Borio, 2003). Table 1 summarises the differing perspectives, which are intentionally stylised. They are intended to highlight two orientations that inevitably *coexist* in current prudential frameworks.

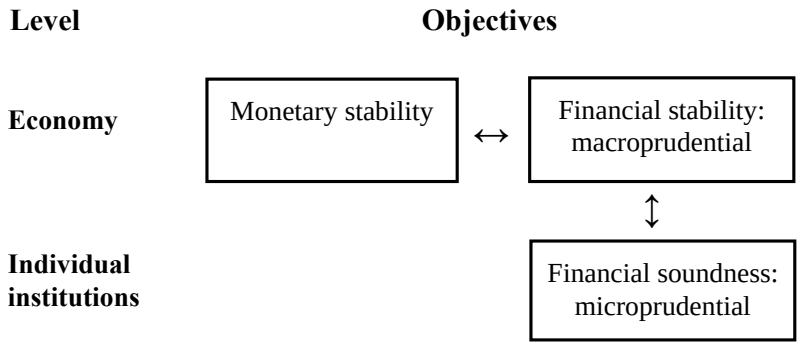
Table 1. The macro- and microprudential perspectives constrasted

	Macroprudential	**Microprudential**
Policy objective	Limit financial system-wide distress	Limit distress of individual firms
Ultimate goal	Avoid output (GDP) costs linked to financial instability	Consumer (depositor/ investor/ policyholder) protection
Characterisation of risk	Dependent on collective behaviour; endogenous	Independent of individual agents' behaviour; exogenous
Correlations and common exposures across firms	Important	Irrelevant
Calibration of prudential controls	In terms of system-wide risk; top-down	In terms of firm risks; bottom-up

Source: Borio (2003)

The distinct objectives of macroprudential and microprudential policies, in terms of Tinbergen, raises two issues. First, it is important to take into account the impact of using one area's instrument not only on that area's own objective, but also on the objectives of the other areas. Being aware of such cross-effects may lead to a choice and use of instrument that is less damaging to other areas, and thus to better overall results. Second, it may not always be possible in this way to avoid conflict of objectives. In that case it is unavoidable to define a hierarchy of objectives. In such situations, the macroprudential concerns should override the microprudential concerns. Figure 2 depicts the proposed hierarchy of objectives. The override should be reversible to prevent forbearance. When a negative stock market shock happens, for example, capital adequacy rules may be temporarily lifted to avoid fire sales. But there must be a clear exit. Otherwise problems may scale up and become worse.

Figure 2. Hierarchy of objectives



Source: Kremers and Schoenmaker (2010)

2.2 Macroprudential policy

Several stocktaking policy papers on macroprudential policy have been published (e.g. G-30, 2010; BIS, 2010a; IMF, 2011; and Longworth, 2011). Often, they discuss the objective of macroprudential policy, the market failures that justify policy intervention, broad classifications of instruments, and implementation issues such as the use of rules versus discretion. Galati and Moessner (2011) provide an overview of the literature.

The wording of the objective differs among authors, but the general view is that it relates to the prevention and/or mitigation of systemic risk. The element of systemic risks to financial stability is also present in the statutory objective of the European Systemic Risk Board (ESRB). Article 3.1 of EU Regulation No 1092/2010 states that:

> *"The ESRB shall be responsible for the macro-prudential 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 the financial system and taking into account macroeconomic developments, so as to avoid periods of widespread financial distress. It shall contribute to the smooth functioning of the internal market and thereby ensure a sustainable contribution of the financial sector to economic growth."*

In addition, the ESRB's statute also contains the ultimate goal of a sustainable contribution to economic growth, in line with Figure 1.

The justification for macroprudential policy intervention emerges clearly in, for example, Brunnermeier *et al.* (2009), Shin (2010), Hanson, Kashyap and Stein (2011) and Aikman, Haldane and Nelson (2011), among others. Put briefly, financial institutions do not internalise the spill-overs of their behaviour to the financial system as a whole and to the real economy. Underpricing of risk, herding behaviour and moral hazard in the presence of implicit safety nets can lead to the build up of financial imbalances over time. When imbalances unwind, shocks quickly propagate through the financial system due to its high degree of interconnectedness. In this process, externalities also relate to price effects of fire sales that hit other institutions with similar assets classes (e.g. Kashyap, Berner and Goodhart, 2011), and failures in rolling over short term wholesale funding (Perotti and Suarez, 2009). What matters in the end may not be the boom itself, but whether it is funded

by credit and leveraged institutions (Crowe *et al.*, 2011). In econometric research, only credit growth has predictive power for financial stress in most countries (Slingenberg and De Haan, 2011). Moreover, recessions associated with bursts in credit and housing markets tend to be longer and deeper than other recessions (Claessens, Kose and Terrones, 2011).

In describing the risk to financial stability, near consensus has emerged on the contribution of Borio and Crockett (2000).[2] Its time series dimension relates to the build up of financial imbalances over time. The cross section dimension captures the risk of spill-overs at one point in time due to interconnections (direct or indirect) of the financial system. The two concepts are not independent of each other. The unwinding of financial imbalances poses more concerns to policy makers if shocks cause strong spill-over effects within a highly connected financial system.

Typologies of macroprudential instruments appear, for example, in G-30 (2010), BIS (2010a), IMF (2011) and Longworth (2011). IMF (2011) is the closest to our approach as it structures instruments according to the time series and cross section dimensions of systemic risk. The Bank of England (2009) and Longworth (2011) link instruments to market failures.

An implementation issue regularly discussed is rules versus discretion. In principle, a rules-based approach by an independent institution would be preferable. Pressures not to act would more likely be resisted, especially in a boom. As a result, policy credibility would increase while a clear mandate would foster transparency and accountability. In practice, a discretionary approach would, however, sometimes be unavoidalble. Limited knowledge on the nature of financial cycles requires some flexibility and room for judgement in policy making.

In our view, the major challenge is in translating the emerging consensus into a coherent and operational policy framework. First, macroprudential supervision needs to be integrated in the overall policy framework for the financial sector, taking interlinkages into account (section 2.1). Second, the institutional setting and the policy framework need to be specified (section 4 and 5). We believe that the missing link is the translation of the objective of financial stability into operational intermediate targets. Once these intermediate targets have been specified, we can select the most effective and efficient policy instruments for achieving them. Specifying all elements of the policy strategy, in particular the objective and intermediate targets, the power to use instruments and accountability, will increase incentives to act. This is especially relevant in good times when imbalances build up and pressures not to act can be strong.

3. Macroeconomic versus structural policies

Macroprudential policy relates to the financial system as a whole. It has an economy-wide impact (Figures 1 and 2). Such policies have macroeconomic and structural dimensions. To illustrate, Duisenberg said that monetary policy (which is obviously macroeconomic) cannot compensate for structural rigidities: *"Do not ask for monetary policy to perform tricks it*

[2] For example, BIS (2010a) structures the literature along the lines of the time series and cross sectional dimensions of systemic risk.

cannot do".[3] Similarly, we need to clarify what type of policy we have in mind for macroprudential policy. In principle there are three options: macroeconomic policies, structural policies, or both.

Macroeconomic policy aims at stabilising aggregate variables such as growth, unemployment and inflation, and thereby support long term economic growth. The two main macroeconomic policies are monetary and fiscal policy. Monetary policy involves the time varying use of instruments - the policy rate as well as unconventional policies - in order to maintain price stability and support economic growth. The scientific discussion includes the effect of monetary policy on inflation (expectations) and the economic cycle. Policy credibility is instrumental in stabilising inflation expectations.

Fiscal policy can be aimed at macroeconomic stabilisation, resource allocation, and income redistribution. The macroeconomic part involves the time varying use of the expenditure and revenue policies[4] to influence the output gap. Alternatively, one may rely on the so-called automatic stabilisers, especially in 'normal' times. In this case, revenue and expenditure are allowed to fluctuate endogenously with the economic cycle. The budget balance improves in good times, and deteriorates in bad times, so that some degree of 'automatic' stabilisation results. The scientific discussion stresses uncertainties about the sign and size of fiscal multipliers,[5] and the effectiveness of fiscal policy in stabilising the economic cycle.

What follows is that the nature of macroeconomic policy is cyclical. It focuses on stabilising economy wide aggregates (inflation, economic cycle) and involves a time varying instrument setting in a stabilising manner. When applied to macroprudential policy, it certainly seems the right approach for addressing the time varying dimension of systemic risk: financial imbalances. Financial imbalances - in the form of credit and liquidity cycles - can be building up in the boom period. The notion of financial imbalances is closely related to Minsky's financial instability hypothesis (Minsky, 1982). In good times, agents tend to underestimate risk and, subsequently, overinvest. This overinvestment is fuelled by credit. The credit cycle is in its upward swing. In bad times, the reverse happens: agents become more risk averse and reluctant to invest. In the extreme, this may accumulate in a credit crunch, where banks are withholding credit for new investment.

The role of cyclical macroprudential policy is in mitigating the build up of financial imbalances at an early stage. Herding behaviour can be individually rational, but lead to imbalances at the macro level. Financial markets are forward looking. As with monetary policy, we therefore believe that the key to policy credibility will be in influencing expectations. Once market participants know that the central bank will step in to stabilise financial imbalances when they are building up, these imbalances may not build up in the first place. Further research on influencing expectations about financial imbalances would be useful. A further analogy with monetary policy is that effects of macroprudential policy will be uncertain and difficult to measure. Experience over time will help in the clarification of

[3] Introductory statement on the meeting of the Governing Council of the ECB, 10 October 2002. See also Duisenberg (2003) on structural reform and its implications for monetary policy.

[4] The instrument is usually summarised as the cyclically adjusted primary balance. This is the budget balance corrected for the endogenous effects of the economic cycle and for interest payments.

[5] See Perotti (2005): "*While most economists would agree that an exogenous 10 percent increase in money supply will lead to some increase in prices after a while, perfectly reasonable economists can disagree even on the basic qualitative effects of fiscal policy*".

objectives and operating paradigms, as it has in the case of monetary policy (BIS, 2010a).

Structural policies are of an entirely different nature. They change the institutions of the economy, through discrete policy reforms, and ultimately aim to improve its long term growth potential. Examples from outside the financial system include labour market reforms (e.g. changes to employment protection legislation or replacement rates) and tax reforms (e.g. reforms aimed at broadening the tax base or moving from direct towards indirect taxation). Examples from within the financial system include changes to the structure of financial institutions (see the discussion on the separation of retail banking from investment banking), static surcharges for systemically important financial institutions, and the deposit insurance system. Under this heading, one may also include reforms to the financial infrastructure, such as central counterparty clearing (CCP) and real time gross settlement (RTGS).

What follows is that structural policies are more suitable for addressing the cross section dimension of systemic risk that originates from externalities in the financial system. Spill-over effects can arise from interconnections within the financial system. Insofar the spill-over effects are not internalised by financial institutions, they are called externalities.[6] The underlying interconnections can be direct or indirect. Prime examples of direct interconnections are interbank exposures through the wholesale payment system or interbank market and, more broadly, counterparty exposures between financial institutions, for example through bilateral derivative trades. An example of an indirect interconnection is common exposures. If financial institutions invest in the same asset, such as housing or oil industry, they will be simultaneously hit by a housing or oil price shock.

Figure 3. Two-pillar strategy for macroprudential policy

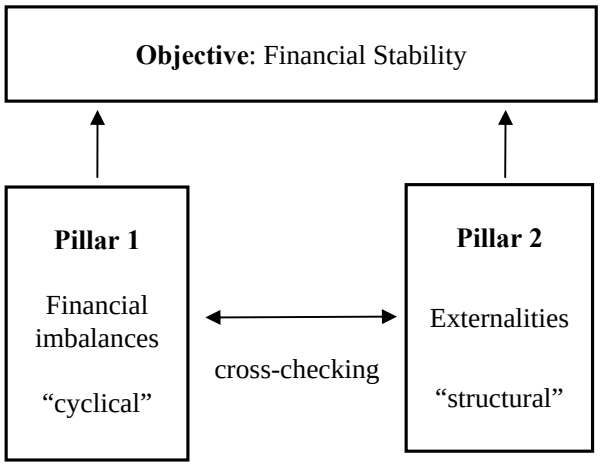


Figure 3 illustrates the intermediate targets, or two pillars, of our macroprudential framework. The first pillar is financial imbalances, for which a macroeconomic policy

[6] In addition to externalities (related to networks and coordination problems), the Bank of England (2009) includes incentive effects in its list of market failures. Incentive effects include moral hazard and adverse selection. A prime example of moral hazard is the implicit guarantee of large financial institutions (the too-big-to-fail doctrine). This moral hazard may induce excessive risk taking. Another example is a compensation structure that gives staff incentives to pursue unduly risky practices.

approach is appropriate. The second pillar is externalities, for which a structural policy approach is appropriate. The cyclical and structural pillars are not fully independent of each other. When the two pillar strategy is applied, authorities must therefore do a cross-check when analysing financial stability developments. Shin (2010) shows, for example, that excessive asset growth and greater reliance on non-core liabilities (wholesale funding) are closely related to interconnections between banks. In a boom when credit is growing rapidly, the growth of bank balance sheets outstrips available core-funding (retail deposits), and asset growth is mirrored in the greater cross-exposure across banks (wholesale deposits).

In a further refinement of our two pillar strategy, De Bandt, Hartmann and Peydró (2009) show the importance of aggregate shocks that can trigger the unravelling of financial imbalances and the spread of contagion.

4. Institutional setting

The design of the institutional arrangements for macroprudential policy comprises several elements. This section discusses decision-making, coordination, accountability and the legal base.

4.1 Decision-making

Which body can best execute the new strategy for macroprudential policy? In the aftermath of the global financial crisis, financial stability committees with a broad remit are emerging worldwide. The European Systemic Risk Board (ESRB) was established following the Larosière Report, while the US Financial Stability Oversight Council (FSOC) was created by the Dodd-Frank Act. Macroprudential policy belongs explicitly to the mandate of these committees (see section 2 for the ESRB). To a varying degree, the central bank, the supervisory agency(ies) and the treasury are represented on the financial stability committees (see IMF, 2011, for an overview).

Committee decision-making tends be more balanced than decision-making by individuals. But this is typically true for committees acting as a body of a single institution (e.g. the executive board of a company or the monetary policy committee of a central bank) or a single system of related institutions (e.g. the European System of Central Banks or the Federal Reserve System). The benefits of committee decision-making need not directly extend to committees representing more or less independent institutions with differing objectives that are supposed to work together. Visser and Swank (2007), for example, show that reputational concerns induces members to manipulate information and vote strategically if their preferences differ considerably.

Decision-making within bureaucracies is far more efficient than across bureaucracies. Each institution or bureaucracy has its own interests and objectives. Furthermore, each institution has its own culture. In an empirical survey, Goodhart, Schoenmaker and Dasgupta (2002) show that central bankers and supervisors have different skill-sets and cultures. The dominant culture at central banks is centred around economists, while supervisors tend to be dominated by accountants and lawyers. That leads to a different perspective: macro versus micro. These differing objectives and perspectives complicate timely information exchange between institutions as well as decision-making in broad-based committees. An illustration is the Northern Rock case, in which crisis management by committee did not appear to be very

effective.

So we argue to give the macroprudential policy mandate to a single authority to foster efficient and timely decision-making (see also IMF, 2011; and BIS, 2011). In our view, that authority should be the central bank. Central banks have a mandate for price stability as well as financial stability. Both mandates steer the overall economy, though with differing objectives. Although the first mandate is explicitly enshrined in legislation, lawmakers are now working on strengthening the financial stability mandate of central banks. The central bank may use a committee with independent outsiders to avoid group thinking. But the crux is that the committee is part of a single institution. A case in point is the envisaged Financial Policy Committee that will be part of the Bank of England.

The alternative authority would be the supervisory agency. It may be tempting to give supervisors macroprudential tools as these tools are related to microprudential tools. The countercyclical capital buffer (macro) is, for example, part of the larger capital adequacy framework (micro), but with a different underlying objective. Moreover, such macroprudential tools also seem to share the same legal base (prudential instruments are written down in detailed legislation, while price stability is only defined in broad terms). The key is in separating between the macro part and the micro part. The macroprudential authority decides on the macro part (the size of the countercyclical capital buffer). The implementation may subsequently be done by the microprudential supervisor if that is more efficient (e.g. implementing the overall capital adequacy framework).[7] Finally, some macroprudential tools may apply to non-regulated entities, outside the remit of the microprudential supervisor. Loan-to-value ratios should apply to all financial institutions that provide mortgages to households. The scope may thus go beyond the regulated entities of banks, insurers and pension funds. The appropriate legal base is discussed in section 4.4 below.

Our proposal is that:

1. central banks get final responsibility for macroprudential policy (including powers to apply macroprudential instruments); and
2. financial stability committees are used to discuss financial stability developments and to dovetail monetary, macroprudential and microprudential policies.

4.2 Interrelations between policies

As discussed in section 2, there are important interrelations between the monetary, macroprudential and microprudential policies (see figure 1). Starting with the first, the conventional view, until recently, has been that monetary policy should confine itself to price stability. According to this view, there is no role for monetary policy to mitigate excessive credit growth and/or asset price bubbles. The global financial crisis has made clear that financial stability is a necessary, albeit not sufficient, condition for price stability (Allen *et al*, 2011). It is also clear that the interest rate instrument cannot achieve the two objectives simultaneously. So, a new separate macroprudential instrument is needed to follow Tinbergen: two objectives – two instruments. Nevertheless, the monetary and macroprudential instruments can, and should, not be used independently.

[7] The ESCB provides, for example, a similar division of labour for monetary policy. The Governing Council decides on the policy interest rate, while the NCBs implement the policy rate through open market operations.

There is an emerging consensus that monetary and macroprudential policy should complement each other. Angelini, Neri, and Panetta (2011) indicate that the benefits of macroprudential policy tend to be sizeable when financial or housing market shocks hit the economy. In these cases a cooperative central bank will "lend a hand" to the macroprudential authority, working for broader objectives than just price stability in order to improve overall economic stability. Borio and Disyatat (2011) also argue that monetary policy (increasing the interest rate) and macroprudential policy (increasing the countercyclical capital buffer or reducing the loan to value ratio) should work together to constrain the credit creation process. Moreover, monetary policy ultimately sets the price of credit through the impact of the policy rate on market rates.

There are also important interactions between macro- and microprudential policies, that warrant appropriate coordination. However, the two policies have distinct objectives and therefore distinct perspectives, as discussed in section 2.1. To be fully effective, each policy domain should apply its policy instruments in relation to its own objective (i.e. stability of the financial system and soundness of individual financial institutions). Coordination can be achieved through appropriate consultation arrangements. The macroprudential authority (central bank) should consult the microprudential supervisor on macroprudential instruments, and vice versa. If the instruments are conflicting in a particular case, the macroprudential objective should be overriding, as argued in section 2. This would be the case, for example, when credit is growing strongly above trend while individual institutions comply with microprudential rules.

The role of the financial stability committees is to monitor and discuss financial stability developments. The committees are also a useful device to coordinate and dovetail the policies of the participating agencies, as discussed above. In that way, the committee can provide governance for specific macroprudential action taken by constituent agencies (FSB, IMF, and BIS, 2011) The financial stability analysis first feeds into the two pillars on which the cyclical and structural approaches are based. Next, it may generate recommendations to other policyfields such as monetary policy, fiscal policy and micro supervision.

4.3 Accountability

The authority for central banks to use macroprudential tools needs to be balanced with clear accountability arrangements. An open issue is the type of accountability arrangement (Quintyn and Taylor, 2002). One option is operational independence as in monetary policy. In this case, accountability arrangements refer to hearings in Parliament. Another option is political accountability to the Minister of Finance, and from the Minister of Finance to Parliament, as in microprudential supervision. Both options do not seem fully applicable to macroprudential policy. On the one hand, political interference needs to be avoided, as it may lead to pressures of too lax policy in a boom. On the other hand, tax payers' money is ultimately at stake in times of financial instability, which obviously involves the Minister of Finance. Goodhart (2010) expects central banks to become more politically dependent in their new financial stability role. Hence, macroprudential policy may require a new accountability regime that is in between those of monetary policy and microprudential supervision.

Quintyn and Taylor (2002) suggest that political accountability can be achieved by a combination of control instruments:

- a mix of parliamentary and government oversight;
- strict procedural requirements: detailed procedures for using the powers to design and implement macroprudential instruments, see next sub-section;
- public understanding: a clear and transparent macroprudential policy strategy (the topic of this paper) facilitates public understanding; and
- judicial review: financial institutions have the right to appeal against the actions of macroprudential authorities.

4.4 Legal base

Another crucial issue concerns the legal base. The scope of macroprudential policy is the financial system as a whole. This includes also the shadow banking sector. The Financial Stability Board (2011) defines the shadow banking system as *'the system of credit intermediation that involves entities and activities outside the regular banking system'*. A financial system wide approach would thus incorporate credit intermediation - a key driver of financial imbalances - inside and outside the banking system. This suggest that legislation should be activity based: whoever is conducting a certain activity (in casu credit intermediation) is subject to the macroprudential rules. Aikman, Haldane, Nelson (2011) also promote an activity based legal approach.

However, the current microprudential regulatory framework is entity based, starting with acquiring a licence before a financial entity can perform "regulated" activities. The inclusion of macroprudential instruments (i.e. the countercyclical capital buffer) in this framework is a good start, but not the end model. Brunnermeier *et al* (2009) argue that shadow banking is a constraint on new banking regulations. If new rules are too cumbersome, business will move outside banks into the shadow banking system. Activity based legislation can address such a shift of activities.

The IMF (2011) suggests the following legally based powers for macroprudential policy:

1. Information collection powers: for the periodic assessment of system risks across the financial sector, the macroprudential agency needs to collect information;
2. Designation powers: the macroprudential agency needs to have the power to bring within the scope of its policies all institutions that generate macroprudential risks. These powers need to apply irrespective of legal form, to include important non-bank financial intermediaries;
3. Rulemaking and calibration powers: a framework that enables the choice of policy instrument and the calibration of policy action to be conditional on the source and the level of systemic risk. Such a dynamic rulemaking system is more efficient that a static set of rules.

In particular, the designation powers are new in the field of financial legislation. In the US, the FSOC is empowered to designate non-bank financial companies as systemically important, subjecting such companies to supervision and regulation by the Federal Reserve. In the UK, the Financial Policy Committee will be empowered to make recommendations to the Treasury on any changes necessary to the regulatory perimeter. Such a flexible approach to enlarge the scope enables the macroprudential authority to adopt the much needed system-wide approach. At the same time, the mandate - related to financial stability - should constrain the discretionary use of powers.

5. Towards a macroprudential policy framework

We are now ready to specify the macroprudential policy framework. The presumption is that each instrument should be effective in achieving its intermediate target. We, therefore, do not follow the common approach based on overview tables with several possible instruments. In choosing targets and instruments our own preferred set-up obviously shines through. However, we also follow as much as possible consensus or broad support in the literature. We also specify each instrument further by relating it to the basic characteristics of a coherent policy framework, as discussed in previous sections.

This proposal should be seen as a first step and not as the definitive framework. The framework allows flexibility to add instruments at a later stage. Moreover, we mention close alternatives to our choices where we are aware of them. Our approach of systematically spelling out the policy framework helps to concentrate on first order effects (i.e. only a few key instruments that are able to address the major macroprudential challenges) and also to highlight remaining open issues.

Macroprudential instruments may be used to prevent bubbles. These instruments are applied at the country level, as asset price bubbles tend to be country specific. Nevertheless, the development of a coherent macroprudential framework, including the design of macroprudential instruments, should be done at the international level given that national financial systems are interdependent. A case in point is the Basel III countercyclical capital charge that increases when the economy is in upswing (credit growth to GDP is above trend) and decreases in the downswing. This instrument is designed at the international level and will be applied at the national level using national credit growth and GDP data.

5.1 Cyclical pillar

Table 2 specifies the cyclical pillar. It contains time-varying instruments for effectively stabilising financial imbalances that cause systemic risks to financial stability. The intermediate target of financial imbalances is divided into sub-targets for credit and liquidity (or maturity mismatch) cycles (Table 2), which dominate the literature. Alternatively, one could also specify the first sub-target in terms of leverage , i.e. the extent to which imbalances are financed by debt instead of equity (Bank of England, 2009). If asset growth is debt financed (i.e. credit), declining asset values will trigger default when the value of the asset drops below the level of debt. This first default may trigger further defaults. By contrast, if assets are equity financed, falling asset values may be absorbed by the investors without necessarily triggering a default. Section 5.3 highlights the difference between the impact of the dot com bubble of 2000 (predominantly equity financed) and that of the US housing market bubble of 2007 (predominantly debt financed). So the leverage and credit approaches are closely related and the underlying analytical framework (i.e. dynamics related to assets financed by debt) is similar.

Table 2. Pillar 1 strategy

Intermediate target	**Financial imbalances**		
Sub-target	Aggregate credit	Credit: Housing	Maturity mismatch
Time varying instrument	Countercyclical capital buffer	LTV ratio	Liquidity charge
Decision making	Central bank		
Interrelations	Financial Stability Committee		
Accountability	To Minister of Finance and/or Parliament		
Legal base	Activity based		

On instruments, a natural starting point would be to influence the price of credit, which is the interest rate. But this would lead to close interference with monetary policy, and not lead to an independent instrument. Attention therefore naturally turned to prudential measures. Indeed, the Basel III agreement already specifies the countercyclical capital buffer. The idea is to build up additional capital buffers when the credit to GDP ratio is above its long term trend. The Basel Committee decided to focus this instrument on increasing resilience (building up a buffer for bad times), and not on stabilising the credit cycle (putting a brake or speed limit on credit growth in good times). Such a cautious approach is understandable given limited experience with the instrument. Our discussion in section 3, however, suggests that the end model should contain an instrument that can effectively stabilise the aggregate credit cycle. A related point is that the proposed one year period for fulfilling the countercyclical buffer requirement seems rather long for a cyclical instrument.

For the housing market, many authors stress the Loan To Value (LTV) ratios. The evidence presented in Crowe *et al.* (2011) suggests that LTV ratios can be effective in addressing a leveraged housing cycle. To prevent regulatory arbitrage, LTV ratios should be applied financial system-wide: banks, insurers, pension funds and other (financial) institutions that provide mortgages. Another option would be to use risk weights on real estate exposures. There is, however, less experience with its application and fewer countries support its use according to IMF (2011). Moreover, risk weights are only applied in banking capital rules, while a financial system-wide instrument is needed.

Liquidity cycles relate to the excessive build up of short term wholesale funding in good times. A strong consensus on the best tool for addressing this sub-target still needs to emerge. Perotti and Suarez (2009) propose a liquidity risk charge, or a levy, on non-core liabilities, for correcting negative externalities caused by banks' excessive reliance on short-term debt. The levy can be increased in good times when imbalances are building up (leaning against the wind). However, even if the levy is held stable it will operate as an automatic stabiliser and increase proportionally with non-core liabilities during the boom (Shin, 2010).

There is at least some experience with the use of this instrument. The UK has a bank tax related to wholesale liabilities, whereby short term liabilities get the full charge and liabilities for longer than one year get half the charge. Germany only taxes wholesale liabilities up to one year. Another option would be to align the liquidity instrument with the Basel III agreement. This would amount to adding a time varying element to the net stable funding

ratio (NSFR) and/or the liquidity coverage ratio (LCR).[8]

5.2 Structural pillar

Table 3 specifies the structural pillar. It contains instruments for effectively addressing risks to financial stability due to externalities within the financial system. In principle one would like to internalise the externalities directly. The difficulty is, however, that abstract concepts do not provide a reference point for policy.[9] We therefore follow the usual BIS classification of the financial system and target externalities at financial institutions, market transactions and financial infrastructures. The first sub-target concentrates on systemically important financial institutions (SIFIs). Because of their size, complexity and systemic interconnectedness, the failure of such institutions would imply large risks to financial stability (FSB, 2010). The second sub-target relates to externalities in markets. The market mechanism can transmit shocks, through the effects of changes in prices, on similar assets classes elsewhere in the financial system. This is relevant from our systemic perspective when market become dysfunctional and prices move from their equilibrium value. This happened during the last crisis due to fire sales, or forced sale of assets at a dislocated price (Shleifer and Vishny, 2010; Kashyap, Berner and Goodhart, 2011).[10] The third sub-target concerns externalities within the financial system infrastructure. The design and oversight of large value payment and securities systems are here in particular relevant. The oversight role of central banks is usually considered an integral element of its function in ensuring financial stability (BIS, 2005).

Table 3. Pillar 2 strategy

Intermediate target	**Externalities**		
Sub-target	Systemically important financial institutions	Markets	Infrastructure
Instrument	Capital surcharge	Collateral based tools	Improvements to resilience
Decision making	Central bank	Central bank/ Conduct of business supervisor	Overseer payment & securities systems
Interrelations	Financial Stability Committee		
Accountability	To Minister of Finance and/or Parliament		
Legal base	Activity based		

Regarding institutions, the FSB (2010) recommends that SIFIs should have higher loss-absorbency capacity than the minimum levels agreed in Basel III. Ideally such capital surcharges should be based on the risks that SIFIs pose due to their systemic position within the financial system. As indicated in section 4.4, this requires designation powers and activity based

[8] The NSFR requires banks to fund long term assets with stable funding, i.e. customer deposits, long-term wholesale funding and equity. The LCR requires banks to hold enough high quality liquid assets cover net cash outflows over a 30-day stress scenario.

[9] Moreover, macroprudential instruments often address different externalities at once (see also Longworth, 2011).

[10] The Securities and Markets Program (SMP) of the ECB was also motivated by dysfunctional markets, as they impair the monetary transmission mechanism. In this case the source of the problem was related to public finances.

legislation. For example, the Federal Reserve is empowered to designate non-bank financial companies as systemically important. Another structural instrument for SIFIs to reduce the moral hazard of too-big-to-fail are the newly developed resolution plans. The explicit objective of resolution plans is to put in place *ex ante* conditions that would allow a wider range of options other than having the whole bank rescued (Avgouleas, Goodhart and Schoenmaker, 2010). A resolution plan is to be used when a bank may get into difficulties. The Financial Stability Board is currently working on this exercise (FSB, 2010).

Another potential instrument for this sub-target concerns legal restrictions on activities. The best know example is probably the legal separation between investment banking and retail banking. The US and the UK are considering to allow macroprudential authorities to break up financial institutions when a threat to systemic stability cannot be otherwise constrained (IMF, 2011). For the moment, we did not include this instrument in our consensus approach, since we are not yet aware of convincing evidence on the link between permissible ranges of activities and systemic risk. Moreover, the last crisis started with the largely unregulated investment banks outside the core banking system.

Regarding markets, increasing margin calls and haircuts in a crisis are seen as a destabilising element in causing fire sales. The valuation of collateral could therefore be based on minimum constant through the cycle margins and haircuts (BIS, 2010b). There is however little evidence on the potential effectiveness of this instrument: the empirical literature has not yet investigated the causality between haircuts and asset prices (BIS, 2010b).

For the infrastructure, the discussion traditionally focused on spill-overs through large value payment and settlement systems. Measures to include resilience against failure include real time gross settlement, delivery versus payment, and payment versus payment. After the crisis (and in particular with resolving AIG), the focus is shifting to clearing houses for OTC derivatives. Furthermore, the MIFID directive increases possibilities for parallel structures of trading and clearing and settlement. Such innovations again underline the need for activity based regulation.

Finally, Pillar 2 raises an open issue on the boundaries of macroprudential policy. The cyclical instruments in Pillar 1 and the surcharge for SIFIs in Pillar 2 have all been developed with macroprudential objectives in mind and can thus be assigned to the central bank in our framework. However, targets and instruments related to market functioning and infrastructure have often already been specified in the current regulatory set-up. In those cases, it could therefore be defended that existing structures are used to the extent possible, and that the interrelations between different targets and tools are discussed within the Financial Stability Committee. To be effective, such structures should allow for a financial system-wide application of the various tools/instruments.

5.3 Application to real cases

The proof of the pudding is in the eating. How would our two pillar approach have worked out in past financial crises? Do they pick up signs of financial stress? In Table 4, we list some major banking failures as well as sector-wide shocks for illustration purposes only. The Barings case is a prime example of an idiosyncratic failure: there were neither financial imbalances nor significant interconnections with other financial institutions. So, there was no financial stress and no need for a rescue. LTCM would, under normal circumstances, also be allowed to fail, but credit spreads were high in the aftermath of the Russian debt crisis (high

financial imbalances) and some major NY investment banks were exposed to LTCM (strong externalities). That is why the Federal New York brokered a bail-out for LTCM, though without spending public money. The Amaranth hedge fund could be liquidated in the absence of financial imbalances and significant externalities.

The bursting of the dot-com bubble in 2000 could have created havoc. But it was largely equity financed. Investors took the hit but there were no ripple-on effects (no failures to repay debt). The bursting of the US housing market in 2007 was very different. The housing boom was debt financed. These mortgage loans were subsequently securitised through CDOs. So, the drop in house prices created a financial crisis, with major losses at US banks. These losses were further spread through the CDOs market. An extreme example of an externality in the financial system with important negative feedback effects between financial institutions and markets. At the same time, financial imbalances, partly due to loose monetary policy, were at an all-time high.
The Lehman failure and RBS / ING (as well as many other US and European banks) came in the aftermath of the sub-prime crisis. These banks were very much interconnected with other financial institutions. Hence, the collapse of Lehman was the onset of an international systemic crisis. To prevent a further deepening of the crisis, RBS, ING as well as many other banks were rescued.

Table 4. The two pillar strategy applied to past crises

Cases	Financial imbalances? Uncertainty	Externalities? Interconnections?
Barings 1995	--	-- (stand alone)
LTCM 1998	+ (high credit spreads due to Russian debt crisis)	+ (some major financials exposed)
Dot com 2000	+/- (aftermath 9/11)	- (equity financed)
Amaranth 2006	-	-
US housing market 2007	++ (house prices)	++ (through CDOs markets)
Lehman 2008	++	++ (international + unknown spill-overs)
RBS / ING 2008	++	++ (unknown spill-overs)

In sum, from an *ex post* perspective it seems that the main sources of financial stress (financial imbalances and externalities) were present in the examples. But policy decisions need to be taken in real time. The ultimate challenge is the timely application of the macroprudential instruments to prevent financial imbalances building up and to make the financial system more resilient.

6. Conclusion

In the aftermath of the global financial crisis, several papers have been emerging on macroprudential policy. The recent literature on macroprudential policy contains many suggestions for possible instruments. Yet, there is no coherent framework. This paper puts macroprudential policy in the overall policy framework for the monetary and financial system and proposes a hierarchy of policy objectives. In particular, we argue that macroprudential policies aimed at the financial system should override microprudential policies aimed at individual financial institutions, when conflicts would arise.

Next, the paper specifies the objective, intermediate targets (pillars), instruments, decision-making, interrelations with monetary policy and microprudential policy, accountability, and the legal base. Following Borio and Crockett (2000), we introduce a macroprudential policy strategy based on two pillars. The first cyclical pillar (intermediate target) concerns the build up of financial imbalances. The second structural pillar concerns externalities arising from interconnections, both direct and indirect, within the financial system.

To make the two pillar strategy operational, the basic presumption is that each instrument should be related to its intermediate target. This allows us to select a limited set of core instruments aimed at stabilising financial imbalances and addressing externalities in the financial system.

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