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Macroprudential Policy: An Organizing Framework[1]

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EXECUTIVE SUMMARY

Considerable efforts are underway to draw lessons from the recent crisis. One of these lessons is the need for an overarching policy framework to address the stability of the financial system as a whole—a macroprudential policy framework.

Macroprudential policy seeks to limit systemic, or system-wide, financial risk. Defining elements of macroprudential policy are its *objective*, its *scope of analysis* (the financial system as a whole and its interactions with the real economy), its *set of powers and instruments*, and their *governance* (prudential tools and those specifically assigned to macroprudential authorities).

Macroprudential policy is a complement to *micro*prudential policy and it interacts with other types of public policy that have an impact on systemic financial stability. Indeed, prudential regulation, as carried out in the past, also had some macroprudential aspects, and the recent crisis has reinforced this focus; hence, a clear separation between "micro" and "macro" prudential, if useful conceptually, is difficult to delineate in practice. Moreover, no matter how different policy mandates are structured, financial stability tends to be a common responsibility, reflecting the far reaching consequences of financial crises. This calls for coordination across policies, to ensure that systemic risk is comprehensively addressed. Equally important, macroprudential policy is no substitute for sound policies more broadly, including, in particular, strong prudential regulation and supervision, and sound macroeconomic policies. Operational independence in other policy areas, including monetary and microprudential policy, should not be undermined in the name of macroprudential policy. Finally, given the global nature of the financial system, the multilateral aspects of macroprudential policy will need to be fully considered—an important aspect that is only touched upon in this paper.

To be effective, institutional arrangements for macroprudential policy need to ensure a policymaker's ability and willingness to act—including clear mandates; control over macroprudential instruments that are commensurate with those mandates; arrangements that safeguard operational independence; and provisions to ensure accountability, supported by transparency and clear communication of decisions and decision-making processes.

This paper draws a number of key takeaways from the work conducted to date within and outside the Fund. Given the partial state of our knowledge, it is too early at this stage to cast these as a set of principles of good practices that could support internationally consistent implementation of macroprudential policies. However, the preliminary views offered on key aspects of macroprudential policymaking, as summarized in Box 1, could form the basis for ensuring broad consistency in Fund advice on macroprudential policies, given growing demands in this area; and could, in due course, be an input towards an internationally agreed set of macroprudential principles. Much further work will be needed in the coming years to achieve this goal.

Box 1. Key Aspects of Macroprudential Policymaking

General

1. The prime objective of macroprudential policy is to limit build-up of system-wide (*systemic*) financial risk.
2. Public policies should comprehensively detect and address systemic risk. In order to preserve this shared objective of financial stability, macroprudential policy interacts with other public policies.
3. Macroprudential policy should primarily address risks arising in the financial system and risks amplified by the financial system, leaving other identified sources of systemic risk to be dealt with by other public policies.
4. Macroprudential policy must not substitute for sound (micro) prudential and macroeconomic policies.
5. *One size does not fit all*; the final shape of the macroprudential policy framework (choice of analytical methods, policy instruments, and institutional arrangements) should take into account existing local conditions.

Diagnosis

6. The monitoring of systemic risks by macroprudential policy should be comprehensive. It should cover all potential sources of such risk no matter where they reside.
7. For the purpose of its systemic risk analysis, macroprudential policy should draw on all useful sources of information and apply a range of approaches: quantitative indicators and models, supervisory data and assessments, and other qualitative information, including market intelligence.
8. Given the global nature of the financial system, the analytical perspective should account for the effects of domestic macroprudential policy on financial stability in other countries and vice-versa.

Instrument choice and use

9. Macroprudential policy should be able to encompass all important providers of credit, liquidity, and maturity transformation regardless of their legal form, as well as individual systemically important institutions and financial market infrastructures.
10. Instruments that can be used to specifically and effectively target systemic risks should be brought under direct control of the macroprudential authority. This authority should have a clear macroprudential mandate, accountability, and operational independence to ensure that best possible use is made of such tools.
11. Macroprudential policy should be entitled to recommend changes in the activation or calibration of policy tools outside its direct control to address identified systemic risks residing in the domain of other authorities. Such tools should neither consist of core instruments of other policies, nor undermine established autonomy of other policies.

Institutional design

12. A macroprudential authority should be identified. It should have a clear mandate and objectives, and should be given adequate powers, matched with strong accountability.
13. Its powers should encompass collection of information, establishing the perimeter of reporting and regulation, and activation—as well as calibration—of instruments under its direct control.
14. The central bank should be given a prominent role in macroprudential policymaking.
15. To ensure effective coordination and cooperation across policies in addressing systemic risks, a *body* or other formal mechanism should be in place to ensure consistency across the relevant policies.

I. INTRODUCTION

1. **It is now widely recognized that in the run-up to the recent crisis, a key missing ingredient was an overarching policy framework responsible for systemic financial stability**. Policy makers were lulled into inaction by the apparent resilience of the financial system. Yet, deep under the surface, the financial system was building up large vulnerabilities that were overlooked by financial regulators and supervisors of individual financial firms. In particular, growing complexity and opacity made it difficult to assess the extent of exposures and potential spillovers, firms were over-leveraged and heavily interconnected, both funding and market liquidity risks were higher than expected, financial intermediation had shifted to the "shadow" banking sector, and there was a critical absence of effective mechanisms to deal with systemically important institutions. Most importantly, neither macroeconomic policymakers nor prudential regulators were in charge of ensuring the stability of the financial system as a whole.[2]

2. **Against this backdrop, there have been increased calls for the development of a policy that can explicitly focus on system-wide risks—a *macroprudential framework*.[3]** Underscoring the importance of this issue, the G-20 regulatory reform agenda has recently turned its attention to this area, calling on the IMF, the Financial Stability Board (FSB), and the Bank for International Settlements (BIS) to develop a macroprudential policy framework.[4] Because financial stability, and the set of policies that can preserve it, are key components of members' domestic and external stability, this is an important area of focus for the Fund and its bilateral and multilateral surveillance, including through the Financial Sector Assessment Program (FSAP). The establishment of macroprudential policy frameworks is also becoming an area of increasing attention for Fund technical assistance.

3. **This paper aims to contribute to the ongoing debate.** Its objectives are to lay out key concepts and an agreed terminology; assess existing practices, the state of knowledge, and priorities for future Fund work in this area; and to support consistency of Fund advice on the development of macroprudential policy frameworks. The paper builds on existing work at the Fund and elsewhere, as well as a survey of country practices in applying financial stability and macroprudential frameworks that was conducted by the Fund in late 2010. The paper is not intended to reach definitive conclusions. Given the breadth and the depth of this topic, more work is needed to develop the whole policy framework.

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[2] Viñals (2010).

[3] Macroprudential policies have been discussed for some time but never fully developed. The first mention of the term macroprudential can be found in the minutes of a Cook Committee meeting in 1979. The IMF first used the term macroprudential in the context of bank supervision in a1998 report (Folkerts-Landau and Lindgren, 1998*).* See Clement (2010).

[4] A joint progress report was delivered to the G-20 in February 2011. See FSB-IMF-BIS (2011).

4. **The structure of the paper is as follows.** Section II lays out some key concepts to clarify what is meant by macroprudential policy. Section III reviews issues in the identification, measurement, and assessment of system-wide risks. Section IV looks at macroprudential instruments. Section V discusses challenges in designing effective institutional arrangements for macroprudential policy, and the need for policy coordination to maintain financial stability. All these sections are centered on some pivotal questions (see Box 2). The final section briefly lays out the work agenda, discusses the possible role of the Fund, and lists issues for discussion. The appendices contain a summary of preliminary findings of the IMF survey, and a review of possible models of macroprudential policy. A more in-depth analysis of survey results is presented as background to this paper.

Box 2. Basic Questions on Macroprudential Policy

Key Concepts

- *What is macroprudential policy?*
- *What are the boundaries of macroprudential policy?*
- *How should the macroprudential policy framework be structured?*

Systemic Risk Monitoring

- *Can systemic risk be identified and measured?*
- *How reliable are the current analytical methods for measuring and monitoring systemic risk?*
- *How to develop an operational framework for measuring and monitoring systemic risk?*

Macroprudential Toolkit

- *Which instruments should be considered part of macroprudential policy?*
- *How should instruments be used?*
- *What are the main challenges in ensuring effectiveness of macroprudential policy?*

Governance and Coordination

- *Who should be represented on a macroprudential authority?*
- *What should be the mandate and powers of the macroprudential authority?*
- *How to ensure accountability of the macroprudential authority?*
- *What mechanisms can ensure domestic policy coordination?*
- *How can international cooperation complement the domestic institutional set-up?*

II. MACROPRUDENTIAL POLICY: KEY CONCEPTS

5. **Developing a macroprudential framework requires defining key concepts.** Unlike for other areas of economic policy, there is little consensus on what is meant by macroprudential policy. While the crisis has sparked an intense debate in both the academia and policy circles, a commonly accepted definition of macroprudential policy, and of its objectives and instruments, is yet to emerge. In its broadest definition, macroprudential policy is seen as a policy aimed at maintaining financial stability—though no common definition exists for the latter. Narrower definitions have focused on macroprudential tools as prudential tools set up with a macro (system-wide) lens.[5] The large increase in the use of the term macroprudential since the outset of the recent crisis has compounded this lack of conceptual clarity. Indeed, the term macroprudential can be applied to different policy models (see Appendices I and II).

6. **This section aims to clarify the concept of macroprudential policy by answering three fundamental questions**:

- What is macroprudential policy?
- What are its boundaries?
- How should the policy framework be structured?

What is macroprudential policy?

7. **Macroprudential policy uses primarily prudential tools to limit systemic or system-wide financial risk**, thereby minimizing the incidence of disruptions in the provision of key financial services that can have serious consequences for the real economy, by (i) dampening the build-up of financial imbalances; (ii) building defenses that contain the speed and sharpness of subsequent downswings and their effects on the economy; and (iii) identifying and addressing common exposures, risk concentrations, linkages, and interdependencies that are sources of contagion and spillover risks that may jeopardize the functioning of the system as a whole.[6]

8. **A central element in this definition is the notion of systemic risk**—a risk of disruptions to financial services that is caused by an impairment of all or parts of the financial system, and can have serious negative consequences for the real economy.[7] Whether financial failures are a source of systemic risk, therefore, depends on the impact on the rest of the financial system and on the economy. For instance, the 1987 stock market bubble in the

[5] See Galati and Moessner (2011) for a comprehensive review of the literature.

[6] See FSB-IMF-BIS (2011).

[7] See IMF-BIS-FSB (2009).

United States, which was fueled by leverage trades, generated systemic risk; while the burst of the dot.com bubble did not, due to limited financial system exposure. Similarly, the Long-Term Capital Management (LTCM) crisis in 1998 (highly leveraged institution, large exposures of systemically important institutions involved) is the example of an event bearing systemic risk, while the fall of Amaranth Advisors (the largest known trading losses and hedge fund collapse in history, but lightly leveraged) in 2006 has not brought the threat of significant impairment of the financial system. Similarly, not all identified credit booms have been a source of systemic risk.[8]

9. **Macroprudential policy seeks to address two specific dimensions of systemic risk: the *time dimension* and the *cross-sectional dimension*.**[9]

- The time dimension reflects a cumulative, amplifying mechanism that operates within the financial system, as well as between the financial system and the real economy. This mechanism, or *procyclicality,* is based on a collective tendency by economic agents, both financial and non-financial, to increase risk exposures during the boom-phase of a financial cycle and to become overly risk-averse during the bust-phase[10]. Procyclicality manifests itself in credit and liquidity cycles induced by excessive leverage in financial firms (but also corporations and households), as well as excessive maturity mismatches in the financial sector. During an upswing, procyclicality makes the financial system and the economy more vulnerable to shocks, both endogenous and exogenous. The build-up in aggregate risk increases the likelihood of financial distress.

- The cross-sectional dimension reflects the distribution of risk in the financial system at a given point of time. If procyclicality sets the destabilizing mechanism in motion, the *cross-sectional dimension* provides further impetus and magnifies the impact of financial distress. Distress may also arise as a result of severe problems without a build-up of weaknesses over time. It depends on the size of institutions, concentration and substitutability of their activities, and the interconnectedness between them. Linkages could arise due to intra-firm exposures (assets, funding) or their vulnerability to common shocks that create prime channels of contagion through spillovers between institutions.[11] These direct and indirect linkages expose all firms to

[8] See Barajas and others (2011).

[9] In practice, these two risk categories are closely intertwined. For instance, while increased complexity and risk concentrations in financial institutions may foster the financial cycle, higher asset growth may in turn lead to greater interconnectedness in the system, as financial institutions build up leverage and non-core funding exposures with other financial institutions and countries.

[10] See Bank of England (2009).

[11] See IMF-BIS-FSB (2009). This paper refers to this dimension as "interconnectedness risk."

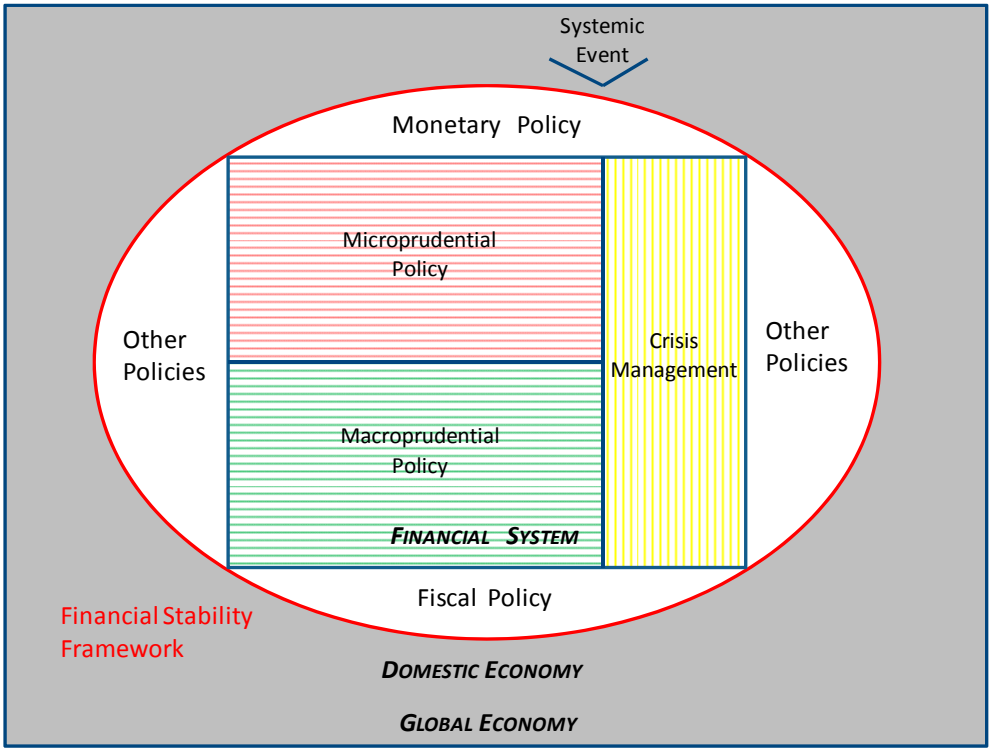
cascading effects of the risk of solvency or liquidity event in any one firm, leading to system-wide liquidity squeeze and runs, as well as fire-sales.[12]

10. **The other central element in the definition of macroprudential policy is the system-wide perspective**. This is because of the "fallacy of composition" of traditional prudential policy: actions that are appropriate for individual firms may collectively lead to, or exacerbate, system-wide problems. Moreover, the complexity of processes that can generate systemic risk, and the ease at which risk can migrate across the financial system, call for a broad focus on the whole range of financial institutions (banks and non-banks alike), instruments, markets, and infrastructure.

What are the boundaries of macroprudential policy?

11. **One difficulty in delineating the boundaries of macroprudential policy is that other public policies also affect financial stability**. While primary responsibility for ensuring the stability of the financial system needs to rest with macroprudential policy, other policies should be able to complement it (Figure 1). No matter how different policy mandates are structured, addressing financial stability and systemic risk is a common responsibility.

Figure1. Financial Stability Framework and Macroprudential Policy



Oval figure: financial stability framework. *Other policies* involve, e.g., policies related to business conduct, consumer protection, accounting rules, and competition.

[12] See Kashyap and others (2011).

12. **An especially prominent role can be played by *micro*prudential policy and monetary policy, both of which impact the cost of risk in the financial system and the economy**. The larger the buffers created by the former, the smaller the need for macroprudential policy to step in.[13] The more monetary policy leans against emerging imbalances, the less the need for macroprudential actions.[14] Indeed, many initiatives are underway in various policy areas to address aspects of systemic risk that have emerged during the crisis, notably in the areas of prudential regulation and supervision, accounting standards, corporate governance, disclosure, and crisis management and resolution frameworks.[15] It is equally important to underline that macroprudential policy cannot substitute for sound policies more broadly, including, in particular, strong *micro*prudential regulation and supervision, and sound macroeconomic policies.

13. **One particularly difficult issue is where to draw the line between "micro" and "macro" prudential policy—or indeed whether such a line can or should be drawn**. Prudential policy, as carried out in the past, also had some macroprudential aspects, and the recent crisis has reinforced this orientation, as evidenced in several international policy initiatives, including Basel III. The move to establish a formal macroprudential policy framework should not lead, inadvertently, to prudential policy becoming entirely "micro" in its orientation. In practice, macroprudential policy uses prudential instruments, and "micro" and "macro" can be seen simply as tensions in perspectives of prudential policy that will need to be managed. Yet, because these tensions could lead to policy conflict, it is useful to separate the two, if only conceptually. In the remainder of this paper, we will, therefore, refer to *microprudential* as a policy aimed at addressing idiosyncratic risk and depositor protection, and *macroprudential* as a policy aimed at containing system-wide risks.

14. **Because of the above, an articulation of a macroprudential policy framework needs to go beyond a definition of its objective**. Additional defining elements include: its scope of analysis; range of risks to be addressed by the policy; set of instruments; and institutional and governance frameworks.

15. ***Objective*.** Maintaining the stability of the financial system as a whole, by limiting the build-up of systemic risk, is the prime objective of macroprudential policy. By contrast, this may be a secondary objective (if at all) of other public policies. The aim is prevention rather than cure, which falls in the domain of crisis management frameworks; and the focus is on the whole financial system and systemic risks, rather than individual institutions and idiosyncratic risks, which are the dominant focus of (micro) prudential policies.

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[13] See Bank of England (2009).

[14] See White (2006).

[15] See Viñals and others (2010).

16. ***Scope of analysis***. The analytical perspective of macroprudential policy should cover all potential sources of systemic risk (see Section III).[16] It should cover developments in the whole financial system (regulated and unregulated), and take into account the feedback loop between the financial system and the real economy, as well as international spillovers (including the effects of domestic macroprudential policies on other countries).

17. ***Range of risks to be addressed***. Macroprudential policy should focus on risks arising primarily within the financial system, or risks amplified by the financial system, leaving other identified sources of systemic risk to be dealt with by other public policies. For instance, macroprudential policy is not intended to address sources of risk associated with macroeconomic imbalances and shocks, or inappropriate macroeconomic or structural policies—for which the first line of defense should be adjustments in macroeconomic policies; or the failure of individual financial institutions (unless they have a systemic impact), which should be addressed by resolution frameworks. In cases where sources of systemic risk fall between the cracks,[17] a mechanism should be in place to identify policy responsibility—as no source of systemic risk should be left unattended. One example is high foreign indebtedness by corporates, which can impact financial stability both directly (through financial institutions' exposures) and indirectly (through the exchange rate channel, especially in dollarized systems). Another example is asset price bubbles generated by capital inflows that were not intermediated by the domestic financial system.[18]

18. ***Set of instruments.*** The core instruments of macroprudential policy are prudential-type instruments, calibrated and used to deal specifically with systemic risk, and applied with a broader financial system perspective. Other instruments could also be added to the toolkit provided that: (i) they target explicitly and specifically systemic risk; and (ii) they are placed at the disposal of an authority with a clear macroprudential mandate, accountability, and operational independence (see Section IV). In all cases, the use of macroprudential instruments should not undermine the autonomy of other policy domains and should not be seen as a substitute for other policies' actions to meet their objectives.

19. ***Institutional and governance framework***. The institutional architecture is a core element of macroprudential policy, just like the central bank is at the core of monetary policy and the treasury is at the core of fiscal policies. The choice of a specific institutional set up depends on local conditions, and international best practices are yet to emerge. However,

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[16] Non-financial risks—such as natural disasters, population change, technological change, political upheaval—are generally outside the scope of analysis, though they could be taken into account under some circumstances.

[17] See White (2004).

[18] Macroprudential policy could be given a role to address such risks (which affect the domestic financial system but originate outside of it), if (i) they are systemic; and (ii) they reside outside other public policies' domain. If so, macroprudential policy should be given specific tools to mitigate these risks.

there appear to be two (possibly overlapping) key elements in this architecture: an authority with a clear mandate for macroprudential policy; and a formal mechanism of coordination or consultation across policies aimed at financial stability.

- The need to identify an authority that oversees systemic risks and decides or recommends policy actions reflects: (i) the need for clarity of responsibility for containing systemic risk, with appropriate incentives to act; (ii) the need for clarity of responsibility over policy instruments; and (iii) the complexity of identifying and monitoring systemic risk, given the breadth of analyses required and the underlying data needs. Such an authority could be a body (e.g., a committee or council) or institution (e.g., a central bank, supervisory agency); and an existing or a new one.

- The need for coordination arises because macroprudential policy interacts with other policies, as noted above. Because financial stability may not be an objective of these other policies, policy conflicts may arise, hence the need for more formal coordination or consultation mechanisms. These may take an institutional form, such as committee or council, or other forms, such as a requirement for the macroprudential authority to be consulted or offer advice on key decisions affecting the financial system. Coordination is especially important when formal authority over tools affecting specific sources of systemic risk rests with bodies other than the macroprudential authority.

How should the macroprudential policy framework be structured?

20. **The discussion above suggests three key elements of the macroprudential policy framework**:

- The analytical framework to identify and monitor systemic risks; processes to identify and collect the necessary data; and the ongoing assessment of risks to the stability of the financial system as a whole (e.g., trends, scale, probability, timing, system resilience) and their prioritization;

- The operational set of instruments to contain risks and prevent them from becoming systemic; rules governing the use of these instruments; and assessments of policy effectiveness; and

- The institutional architecture of macroprudential policy, including mechanisms of governance, accountability, and transparency; and coordination of macroprudential policy with other public policies aimed at preserving financial stability.

The next sections will analyze each of these elements in turn.

III. Systemic Risk Assessment and Monitoring

21. **Macroprudential policy requires a capacity to identify systemic risks early enough so timely action can be taken to support financial stability**. Ideally, systemic risk measures would be linked to macroprudential policy goals and tools. For instance, a risk measure breaching a given threshold would prompt policy makers to provide a policy response. In turn, continued monitoring of such a measure would be important feedback in withdrawing policy actions (and evaluating them ex post). Finally, systemic risk measures should help calibrate policy responses, for example by simulating potential shocks through the regular conduct of macro stress tests.

22. **Several gaps remain in developing the analytical framework**, especially to improve its reliability and forward looking capacity in assessing systemic risk. This section identifies priorities in this area by addressing three key questions:

- Can systemic risk be identified and measured?
- How reliable is the current analytical toolkit to monitor systemic risk?
- How to operationalize an assessment of systemic risk?

23. **In doing so, this section builds on the existing analytical framework within and outside the Fund to assess risks to macrofinancial stability**, such as in the context of the FSAP. The primary focus is on the frontier of development; however, the vast majority of the analytical toolkit developed before the current crisis to assess financial stability (such as Financial Soundness Indicators and macro stress testing) remains a cornerstone of the analysis in the majority of member states.

24. **A number of challenges should be acknowledged at the outset.** First, while this section focuses on quantitative approaches to systemic risk, the nature of financial crises limits the ability of statistical tools to predict them, and "preparing to fight the last war" is an obvious pitfall.[19] Therefore, policymakers may never be able to rely solely on quantitative tools to identify and monitor systemic risk to guide their macroprudential actions, and these tools need to be complemented with more qualitative assessments, including supervisory ones and market intelligence. Second, progress in systemic risk analysis depends heavily on data availability, including long time series and higher frequency data to capture the build-up of imbalances as early as possible. This challenge is being tackled at the international level through the combined efforts of the IMF, FSB, and BIS.[20] More broadly, systemic risk monitoring needs to be tailored to specific country conditions, so as to reflect, for instance,

[19] See IMF (2010d).

[20] See FSB-IMF (2010). Key data gaps relate to the balance sheets of individual financial institutions (which are often confidential supervisory data), off-balance sheet transactions, nonbank financial institutions, and cross-border activities of financial institutions.

stages of financial market development and statistical data collection. Indeed, survey responses point to the lack of data availability as a major factor limiting the use of quantitative models.

Can systemic risk be identified and measured?

25. **One can identify certain key criteria that should guide the choice of systemic risk measures used for macroprudential policy purposes**.[21] There is vast literature addressing the development of measures and indicators on the causes of financial crises, business and financial cycles, crisis prediction, credit booms, and related sources of systemic risk.[22] Ideally, systemic risk measures should contain information about, or be linked to, final macroprudential policy objectives. In particular, they should: (i) contain information of a build-up of systemic risk in both the time and cross-sectional dimensions; (ii) be assessed accurately and with minimum possible lags; and (iii) have forecasting power for financial instability and output shocks.

26. **In the time dimension, indicators to assess risks related to procyclicality (aggregate risk) can be categorized by main sources and propagation channels**: (i) macro aggregates and forecasts (domestic, external, and sectoral imbalances), as natural indicators of the state of business and financial cycles; (ii) leverage ratios in the financial, corporate, and household sectors, as other measures reflecting the stages of financial cycles; (iii) credit-to-GDP gap measures, developed recently and found to be particularly reliable and forward looking indicators;[23] (iv) fundamental analysis, including based on balance sheet indicators of financial institutions related to stages of a financial cycle (especially ratios of non-core to core liabilities to indicate liquidity risks);[24] (v) asset prices; (vi) various value-at-risk (VaR) models that are widely used to capture the relationships between macroeconomic and financial variables in an integrated fashion; and (vii) macro stress tests that have traditionally been designed to assess how the financial system would react to a macroeconomic shock drawn from a tail of the underlying probability distribution.[25]

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[21] Out of the 60 countries that responded to the IMF survey, a majority rely on various quantitative approaches to identify and assess systemic risks. On total, they use 60 risk monitoring indicators, ranging from indicators on bank capital and bank performance to indicators on liquidity and macro aggregates.

[22] See, for example, Borio and Drehmann (2009) and IMF (2009).

[23] Survey respondents frequently cite credit growth or credit-to-GDP measures as leading indicators. See Basel Committee on Banking Supervision (2010) and Drehmann and others (2010) on more detailed discussion on this measure.

[24] See Shin (2010). These indicators were also frequently cited by survey respondents.

[25] Survey results indicate that stress tests are among the most popular models being used. For an overview of stress testing approaches, see Cihak, Madrid, and Ong (2011), Sorge (2004), and van Lelyveld (2011).

27. **In the cross-sectional dimension, measures of concentration are relatively straightforward, but methodologies to assess risks related to interconnectedness are still work in progress**. Measures of size and concentration include total assets, equities, credit, deposits, and other forms of intermediation in percent of total market size or GDP. The tools used for identification and measurement of risks related to interconnectedness range from describing interlinkages to using them to compute joint probabilities of distress among institutions. Key approaches include: (i) linkages through bilateral balance sheet exposures at the level of jurisdictions or financial institutions; (ii) contingent claims analyses (CCA) that build risk-adjusted balance sheets for financial institutions and sovereigns (and help assess risk transfer across sectors); (iii) probabilities of distress for groups of financial institutions, and other measures of distress dependence using equity price or credit default swap (CDS) spread data; (iv) measures of financial institutions' contribution to systemic risk, such as network analyses based on bilateral and common (similar) exposures that can help to assess the potential for solvency or liquidity shocks affecting one financial institution to spill over across banks or countries; and (v) other market-based indicators that are used, for instance, to detect regime shifts in financial market volatility and rising systemic risks.

28. **There is ample scope to improve the toolkit in both dimensions.** With respect to financial distress and its relationship with the stage of a cycle, a priority is to refine models that combine micro and macro aspects, and to incorporate more explicitly forward looking measures of leverage and risk-taking in the financial system, as endogenous amplifying mechanisms.[26] With respect to network risk, it is critical to establish the performance of tools as best performing indicators of systemic risks, and thus their reliability in guiding policy at any point in time.[27] Thus far, an important obstacle is the lack of access to sufficiently detailed data, in particular firm-level data on bilateral exposures that are needed to conduct richer network analyses. In both areas, there is also a need for work to identify thresholds for risk indicators, to help provide timely alerts on the build-up of vulnerabilities.

How reliable is the current analytical toolkit to monitor systemic risk?

29. **For macroprudential policy purposes, aggregate risk monitoring should be robust, forward looking, and contrarian.** Risks tend to build up during periods of apparent tranquility, when economic agents "take their eyes off the ball." Therefore, tools to measure systemic risk need to provide enough lead time for the policy response to attenuate the cyclical impact of mounting vulnerabilities.

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[26] For instance, work on reverse feedback effects from the financial sector to the real economy is ongoing as part of improvements to the Fund's macro stress-testing framework (e.g., through credit supply conditions).

[27] Most analyses to date suggest that market-based indicators are more coincident than forward-looking measures of systemic distress. However, certain approaches, such as CCA, joint probability of default (JPoD), and the Bank Stability Index (BSI), may provide good measures of the vulnerability of groups of financial institutions, and hence signal how systemic an individual (or a sectoral one in the case of CCA) default may be.

30. **While a wide range of approaches has been developed in recent years to measure systemic risk, selecting the best tools to guide macroprudential policy is still a challenge**. Given the diversity of risks and contagion channels that can lead to financial instability (as highlighted again vividly during the recent crisis), new analytical approaches have flourished. Going forward, this makes it all the more important to determine which tools are the most promising and best performing, that is, to pursue research in the area of back-testing tools to assess their accuracy in measuring systemic risk and out-of-sample forecasting properties.[28]

31. **To date, no tool has proved sufficiently reliable to predict financial stress and guide policymakers.** Based on the above, empirical research seems somewhat more advanced in assessing the *likelihood* of shocks, including based on a large variety of techniques and market-based and other indicators, many of which are part of common risk management practices. In contrast, regarding the *impact* of shocks, the agenda is more challenging, mainly because of the needs to: (i) model financial institution behavior under stress, and (ii) rely on simplifying assumptions due to the lack of sufficiently granular data on financial institutions. In both areas, another key challenge is to capture (model) non-linearity effects, as also underscored by a few IMF survey respondents.[29]

32. **Therefore, establishing a stronger early warning capacity is a major priority for further work.** Efforts to establish robust relationships, including time lags, between financial variables and measures of financial stress could be aimed at decomposing the various aspects of risks addressed above, for instance, by grouping measures of systemic risk within the time and cross-section dimensions separately. In the time dimension, the objective would be to identify risks and guide policy responses with sufficient lead time in the cycle. In the cross-sectional dimension, it may be necessary to quantify the contribution of each selected institution or market to systemic risk, which could then be aggregated into an overall risk measure.[30] Such work could initially focus on indicators of systemic risk that seem the most promising forward-looking measures from a macroprudential standpoint, including:

- *The credit-to-GDP gap:* This measure of time dimension risks has demonstrated relatively strong performance in explaining the occurrence macrofinancial shocks.[31] However, it also exhibits considerable inertia, and its relationship with the *timing* of shocks needs to be enhanced. Therefore, this indicator needs to be improved, including in combination with other variables.

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[28] See BIS (2008).

[29] See also Barrell and others (2010a and 2010b).

[30] See Borio (2010).

[31] See Borio and Drehmann (2009).

- *The Bank Stability Index:* This index, and the associated Joint Probability of Default (JPoD), are among the tools that depicted well the rise in systemic risk ahead of the July 2007 crisis. However, none of these indicators captured rising liquidity risk in funding markets in advance.

- *The systemic CCA:* This approach quantifies the contribution of specific institutions to the dynamics of systemic risk. It also shows how this risk affects the government's contingent claims over time. In this sense, it gives a magnitude of expected losses in a forward-looking manner taking into account time-varying interdependence of financial firms.[32]

How to operationalize an assessment of systemic risk?

33. **Given the diversity of risks factors, combining the signals provided by individual tools may be necessary to obtain a reliable assessment of systemic risk**. Fragmented analyses are likely to underestimate risks, and a central challenge is to "connect the dots" by analyzing how shocks may spread across markets, sectors, countries, or regions. For instance, credit-to-GDP ratio deviations from a long-term trend can be caused by a slowdown of economic activity, but not necessarily by financial distress. Similarly, early warning models are open to criticism that past relationships may not hold in the future. While identifying a single measure of systemic risk may not be easy, composite indicators could be an important step in supporting the formulation and conduct of, and communication about, macroprudential policy.

34. **Combining signals is also essential due to the synchronicity of business and financial cycles over time and across countries**. Recent research has shown that recessions associated with severe credit crunches or house price busts are deeper and longer than other recessions (Box 3). Furthermore, credit and asset price cycles accentuate each other, and these cycles are highly synchronized across countries. Thus, in order to assess both the magnitude and impact of build-up of systemic risk, signals from different financial variables and markets (credit, house prices, and other countries) need to be tracked along with the state of the GDP cycle. This is where judgment based on generic features of the cycle is essential. Research also shows that business and financial cycles are more pronounced in emerging economies, and that fluctuations in credit and house prices seem more important for the real economy in advanced countries—whereas capital flows tend to influence economic activity more in emerging economies.[33]

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[32] See Gray and Jobst (2010) for more details. For the U.S. case, they show that following the collapse of Lehman Brothers, the extreme tail risk in the system increased sharply and market prices implied a minimum loss of 20 percent of GDP with a probability of 5 percent over a one-year time horizon, which later dropped to 2 percent of GDP during 2009.

[33] See Claessens, Kose, and Terrones (2011a and 2011b).

Box 3. How Business and Financial Cycles Matter for Macroprudential Policies

The design of effective macroprudential policy tools requires a solid understanding of the linkages between financial sector and real economy. To assess whether a macroprudential policy maker needs to be concerned about credit growth requires a view on whether credit growth is excessive. This in turn depends on whether (and to what extent) adverse implications for the real economy may materialize when the credit cycle turns.

Two recent studies have analyzed in detail the features of business and financial cycles and their linkages (Claessens, Kose and Terrones, 2011a and 2011b). The results suggest that business and financial cycles have different characteristics, yet often closely interact and affect each other.

Business and Financial Cycles: How Different? How Intertwined?

- *Financial cycles are often much longer and severe than business cycles.* While a typical recession (recovery) lasts close to 4 (5) quarters a financial downturn (upturn) lasts between 6 to 8 (11 to 18) quarters. And, while output falls by 2.5 percent during a typical recession, house prices and credit fall by 6 percent and equity prices by 28 percent in a financial downturn. These differences are more pronounced for the intense phases of business and financial cycles.

- *Many recessions are associated with financial disruptions, notably credit crunches and house price busts.* In one out of six recessions, there is also a credit crunch underway, and in one out of four recessions a house price bust. Equity price busts overlap with one-third of recessions. There can be lags between financial market and real events. A recession, if one occurs, can start as late as five quarters after the onset of a credit crunch or housing bust.

- *There are strong linkages between business and financial cycles.* Recessions associated with financial disruptions tend to be longer and deeper than other recessions. Although recessions with severe credit crunches or house price busts last only about three months longer, they typically result in output losses two-three times greater. Recoveries associated with credit and house price booms are more robust. Equity cycles appear to matter less for the economy.

- *Business and financial cycles are more pronounced in emerging markets than in advanced economies.* The median decline in output during recessions is much larger in emerging markets than in advanced countries. In parallel, recoveries in emerging markets are twice stronger than in advanced countries. Fluctuations in credit and house prices seem more important for the real economy in advanced countries, whereas capital flow cycles tend to influence economic activity more in emerging markets.

- *Financial cycles tend to accentuate each other, making for busts or booms.* Credit downturns that overlap with house price busts are longer and deeper than other credit downturns. Conversely, a typical credit upturn becomes 25 percent longer and 40 percent larger when it coincides with a housing boom. Financial cycles are also highly synchronized across countries, with globally synchronized downturns typically displaying larger declines in credit and asset prices, and synchronized upturns often more buoyant.

Implications for Macroprudential Policies and Surveillance

These observations provide useful input for the ongoing discussions about macroprudential policies and surveillance. First, macroprudential policies ought to consider the interactions between business and financial cycles, especially severe recessions that are usually associated with financial disruptions. Second, given the many interactions between various financial and business cycles, close monitoring of cycles in different financial markets should be an integral part of surveillance. Third, since financial cycles are often synchronized internationally, it is necessary to consider the global aspects of financial regulation and surveillance. Fourth, to be effective, policies need to adapt to country circumstances to take account of, for example, the higher volatility that emerging market economies face.

These findings also suggest some specific macroprudential policy actions to consider:

- Requiring larger countercyclical buffers and using stricter loan-to-value (LTV) ratios is more desirable when both house prices and credit are growing rapidly (rather than just credit) since recessions associated with large changes in both financial variables are longer and deeper.

- Buffers (capital or liquidity) need to be higher for those markets that tend to suffer deeper recessions with more severe financial downturns, which at least until the recent financial crisis, happened more in emerging markets than in advanced countries.

- Macroprudential policies need to be global given that markets are global. For example, capital surcharges need to be global to effectively mitigate (and build buffers during) financial booms, and contain cross-border spillovers.

35. **Work on constructing integrated systemic risk measures (IRM) should be pursued, building on recent efforts**. Ideally, the IRM would be simple to construct and interpret; would help identify vulnerable countries and regions, while taking into account individual country specificities; and would help policymakers design adequate policy responses. Also, in light of the above, it would need to capture several key aspects of the buildup of systemic risk, including high credit growth and leverage (e.g., reliance on non-core funding), and rising interconnections.[34] There have been ongoing efforts to construct such measures both in and outside the Fund:

- The Fund produces aggregate vulnerability measures and rankings for its internal vulnerability and early warning exercises. Inputs used in this context include a range of qualitative and quantitative approaches, such as a global financial stability map, volatility heat maps, global risk appetite measures, and various systemic risk models.[35]

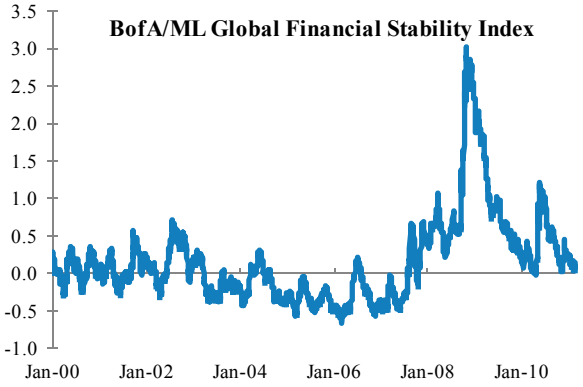
- Outside the Fund, recently-developed measures include the *Global Financial Stress Index* (BofA Merrill Lynch), the *Composite Indicator of Systemic Stress* (ECB), and the *Macro Prudential Indicators,* or MPI (Fitch Ratings) (Figure 2). The first two indicators are global and by nature do not differentiate shocks by country or region. However, similar indicators can be developed for groups of countries and can be tracked frequently, as they both use mostly high-frequency market data. The MPI is a measure of procyclicality based on macro variables that indicates the stage of a crisis on a country basis.

36. **In the absence of a robust single measure, a pragmatic approach may be to monitor a set of selected indicators, depending on each country's circumstances**. At this stage, the above measures do not seem to provide enough forward-looking capacity to meet the needs of macroprudential policymakers. The best tools in this regard may be country-specific, depending on the level of development, the structure of financial system, the type of monetary and exchange rate policy regime, the openness of economy to capital flows, etc. For illustrative purposes, an example of an integrated system that policy makers could rely on to monitor systemic risk is provided in Box 4.

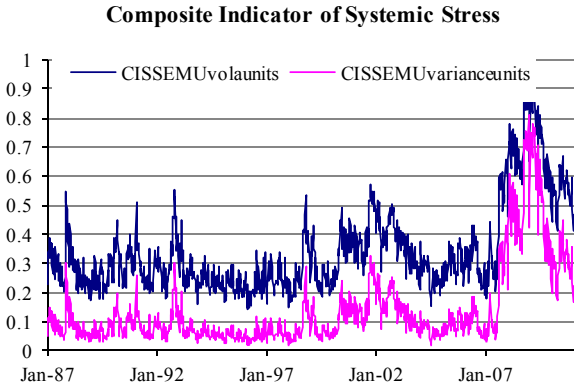
[34] Based on the above discussion of the differential information content of credit and market-based variables, information on credit and leverage and the common (or principal) component of market-based indicators for joint probabilities of distress could be combined, giving a 'large' weight to 'large' changes in any of the underlying variables.

[35] See IMF (2010d) and De Nicoló and Lucchetta (2010).

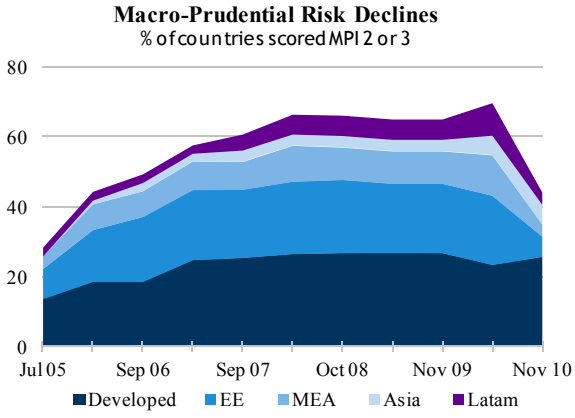
Figure 2. Examples of Aggregate Risk Measures



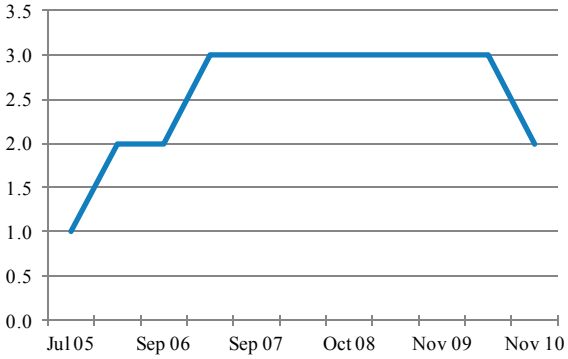
Source: Bloomberg.



Source: ECB.



Source: Fitch



Source: Fitch.

Box 4. An Illustrative Example of Systemic Risk Monitoring (Systemic Risk Dashboard)

A "systemic risk dashboard" aims to cover the key risk categories and approaches discussed above, distinguishing between the likelihood of shocks and their potential impacts, as well as between high and low-frequency monitoring tools. For each dimension, it proposes to rely on one or two specific analytical tools that are identified as the most robust and useful from an early warning perspective. Importantly, such a system needs to be tailored to individual countries' circumstances—reflecting aspects such as the degree of market development and data availability—and should be revisited and updated over time.

AGGREGATE MEASURE

Low Frequency	*High frequency*
Crisis risk models	Systemic CCA

LIKELIHOOD OF SHOCKS

From asset quality/price deviation

Low Frequency	*High frequency*
Credit/GDP deviation	Regime shifts in financial market volatility (e.g., interest rate, currency, and equity markets)
House prices	

From concentrations/connectedness

Low Frequency	*High frequency*
Interbank exposures	Distress dependence (JPod, BSI)
Core/non-core liabilities (aggregate)	

POTENTIAL IMPACTS

Through balance sheet exposures

Low Frequency	*High frequency*
Leverage measure	EDF measures for main SIFIs
Macro stress tests	

Through interconnectedness

Low Frequency	*High frequency*
Network models	CCA-related measures of joint losses
Cross-border exposures of banking systems	

Note: CCA stands for Contingent Claims Analysis; JPod=Joint Probability of Distress; BSI=Banking Stability Indicator; EDF=Expected Default Frequency.

IV. MACROPRUDENTIAL POLICY TOOLKIT

37. **Little consensus has emerged as to the type of instruments that should form part of a macroprudential toolkit**. This reflects the early stage of development of the concept of macroprudential policy more generally, and that more empirical work and operational experience is needed to better understand how instruments should be designed and calibrated, and the effectiveness of each instrument. Indeed, the decision as to which instruments should be included in the toolkit critically depends on addressing the issues discussed in Section II and III. An additional complication is that many policy tools affect systemic risk, but not all of them should be considered macroprudential instruments.

38. **This section addresses three key questions:**

- Which instruments are macroprudential?
- How should instruments be chosen?
- How should they be used?

Which instruments should be considered part of macroprudential policy?

39. **The recent crisis has provided impetus for the development of instruments specifically designed to address systemic risk**. But independent of these developments, some countries have used for some time instruments to address specific aspects of systemic risk, often without referring to them as macroprudential. In particular, experience has accumulated in emerging markets on constraining the build-up phase of the financial cycle (especially in credit imbalances and foreign exchange mismatches); and in several countries, on structural measures to address risk concentrations and interconnectedness. At the other extreme, some countries have recently deployed so-called macroprudential instruments to achieve policy objectives that were not always, or not solely, related to systemic risk.

40. **The need therefore arises to provide clarity as to which instruments can be considered macroprudential, and which instruments cannot**. In the remainder of this section, macroprudential tools are defined to fall into two categories:[36]

- Instruments specifically tailored to mitigate the time-varying or cross-sectional dimensions of systemic risk (category I); and

- Instruments not originally developed with systemic risk in mind, but that can be modified to become part of the macroprudential toolkit provided that: (i) they target *explicitly* and *specifically* systemic risk; and (ii) the chosen institutional framework is

[36] This section draws on FSB-IMF-BIS (2011).

underpinned by the necessary governance arrangements to ensure there is no slippage in their use (see Section V) (category II).

41. **Instruments in these two categories include primarily, but not exclusively, instruments normally regarded as of a prudential nature** (Table 1). In practice, a clear delineation of prudential instruments as "micro" or "macro," or even a crisis management tool, is difficult, as the same instruments may serve multiple objectives depending on how they are used. A good example is contingent capital, which if applied to all banks and activated before a systemic event would be microprudential; if applied to systemically important institutions only would be macroprudential; and if activated in response to a systemic event would be a crisis management tool. In addition and as noted earlier, a number of *micro*prudential instruments incorporate macroprudential considerations (Box 5).

Table 1. Macroprudential Instruments

Tools	Risk Dimensions	
	Time-dimension	**Cross-Sectoral Dimension**
Category 1. Instruments developed specifically to mitigate systemic risk		
	▪ Countercyclical capital buffers ▪ Through-the-cycle valuation of margins or haircuts for repos ▪ Levy on non-core liabilities ▪ Countercyclical change in risk weights for exposure to certain sectors ▪ Time-varying systemic liquidity surcharges	▪ Systemic capital surcharges ▪ Systemic liquidity surcharges ▪ Levy on non-core liabilities ▪ Higher capital charges for trades not cleared through CCPs
Category 2. Recalibrated instruments		
	▪ Time-varying LTV, Debt-To-Income (DTI) and Loan-To-Income (LTI) caps ▪ Time-varying limits in currency mismatch or exposure (e.g. real estate) ▪ Time-varying limits on loan-to-deposit ratio ▪ Time-varying caps and limits on credit or credit growth ▪ Dynamic provisioning ▪ Stressed VaR to build additional capital buffer against market risk during a boom ▪ Rescaling risk-weights by incorporating recessionary conditions in the probability of default assumptions (PDs)	▪ Powers to break up financial firms on systemic risk concerns ▪ Capital charge on derivative payables ▪ Deposit insurance risk premiums sensitive to systemic risk ▪ Restrictions on permissible activities (e.g. ban on proprietary trading for systemically important banks)

Box 5. Adjusting *Micro*prudential Tools to Account for Systemic Risk

Prudential tools are being adjusted to strengthen the resilience of the financial system and mitigate systemic risk. To this end, some elements of the new capital and liquidity regime under Basel III should help mitigate systemic risk. Higher level and quality of capital should improve self-insurance of institutions and, at the margin, better buffer them against the risks associated with credit and asset price cycles. Similarly, the new *leverage ratio* encourages banks to increase capital commensurate to asset expansion, which in turn should help dampen the rate of bank balance sheet expansion and contraction through the cycle, and the associated amplifications. The new *"conservation" buffer*, calibrated with systemic risk in mind, will add an extra layer of capital that will build up in good times and cannot be eroded in bad times by earnings distributions. Finally, the new quantitative liquidity rules—the *liquidity coverage ratio* (LCR) and the *net stable funding ratio* (NSFR)—should help increase banks' liquidity buffers and lower maturity risk transformation, which in turn should make them more resilient against the transmission and amplification of liquidity shocks.

Work is also underway to internalize the time dimension within the banks' capital function. The main feature of *through-the-cycle methodologies* is that the calculation of capital requirements should disregard short-term fluctuations in default risk, and instead should reflect only the permanent, long-term structural component of risk. Fluctuations in the probability of default should approximate the trends of the business cycle, which would help in calibrating a generic buffer based on macro indicators. Such a framework will incentivize banks to make additional investments in their risk measurement systems, though supervisors will have to rely on firms' internal risk management structures, and their own capacity to assess those structures.

In particular, Basel III will correct some of the inputs of the capital function by adding stressed periods or scenarios, in order to make capital requirements less volatile through the cycle. For instance, the introduction of a *stressed VaR* in the market risk framework should help build additional capital through the upswing. The Basel Committee on Banking Supervision (BCBS) will also carry out a more fundamental review, with a view to reduce reliance on cyclical VaR-based capital estimates, for example by expanding the role of stress testing (BCBS 2011). Other proposals have included rescaling the risk-weighted assets by incorporating recessionary conditions in the banks' estimated probability of defaults, versus a "one point in time" calibration (see for instance CEBS 2009 and FSA 2009). Basel III also requires higher capitalization for trading and derivative activities, complex securitization and off-balance sheet exposures, and capital incentives for banks to use central counterparties for over-the-counter (OTC) derivatives.

Efforts are also underway to incorporate *a time-varying component in the accounting framework* to make provisioning rules less procyclical. The main advantage of this approach is that provisioning is less fungible than capital since provisions are allocated on a "per loan" basis (and it is therefore easier to monitor) based on expected loss. In the current proposals of accounting standards setters, however, the time-varying component is negligible due to concerns that incorporating an extended forecast period could distort the transparency of accounting values. The International Accounting Standards Board (IASB) and the U.S. Financial Accounting Standards Board (FASB) have broadly agreed that expected losses should be estimated over the loans' lifetime, using information that includes forecasts of future conditions. The details of the proposals have yet to be worked out.

42. **Survey responses suggest that countries have used a variety of other tools—of monetary, exchange rate, fiscal, and competition policies—for the purpose of constraining systemic risk**. Those instruments would typically *not* be considered macroprudential, unless they fulfill the conditions noted under category II above. For instance, marginal reserve requirements would not belong to the macroprudential toolkit if actively used for monetary policy purposes; limits on the level or growth of sectoral or aggregate credit could potentially belong to the toolkit if no longer in use by monetary policy (as is the case in many countries), and explicitly reassigned to the macroprudential authority. Capital controls, which are motivated by both macroeconomic and financial considerations, are not typically macroprudential instruments, although they could be, if they specifically

target systemic risk and are underpinned by strict governance arrangements that ensure no slippage in their use. For instruments that can affect systemic risk, but are actively used by other public policies, a need for policy coordination arises which is discussed in Section V.

43. **Macroprudential instruments in the time dimension aim to reduce the accumulation of systemic risk in an upswing, and the corresponding rapid unwinding of risk in a downswing**. Their key characteristic is to include calibrations that are based on some measure of the financial cycle. Three instruments are currently being considered explicitly to mitigate procyclicality: (i) the countercyclical capital buffer put forth as part of the bank capital framework under Basel III; (ii) a levy on non-core short-term liabilities; and (iii) countercyclical variations in margins or haircuts on collateral used in the securitized funding markets (such as repo markets).[37]

44. **A number of countries have recalibrated existing prudential instruments to address procyclicality**. To this end, some countries have included countercyclical changes in risk weights on banks' exposures to certain instruments, sectors, or markets (e.g., for foreign currency-denominated loans, consumer credit, real estate, or the stock market) to dampen the excessive build up of credit risk during periods of high credit growth and asset price movements.[38] A rules-based dynamic provisioning framework has been implemented in Spain since 2000, which requires banks to build up buffers of general provisions against performing loans during an upswing, which can be drawn down in a recession.[39] Countries have also used time-varying caps on LTV, Loan-To-Income (LTI), Debt-to-Income (DTI) ratios, or criteria for loans' eligibility to limit the amount that can be borrowed by individuals or firms.[40] The empirical literature tentatively supports in particular the effectiveness of LTV ratios in taming housing booms (Box 6). Some countries have also used direct monetary policy instruments to constrain credit supply during booms, such as limits on the level or growth rate of aggregate credit or specific exposures, and marginal reserve requirements, as well as fiscal policy tools, such as stamp duties on property holding, to tame speculation in real estate markets. These tools could be considered macroprudential subject to the conditions noted earlier in the section.[41]

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[37] See BCBS (2010), IMF (2010c), and CGFS (2010a).

[38] For instance, India introduced capital risk weights on commercial property lending in 2005 and gradually increased them until the third quarter of 2008, when the adjustments were reversed in a countercyclical fashion.

[39] See Saurina (2009).

[40] For instance, LTV caps were reduced countercyclically in Hong Kong SAR, Singapore, and China in 2009–10; DTI caps were countercyclically adjusted in Serbia in 2010; and several non-euro area EU countries tightened loan eligibility criteria on foreign currency lending.

[41] Limits on credit growth have been used recently in a countercyclical fashion in Serbia and Malaysia. Brazil, Bulgaria, Colombia, China, India, and Saudi Arabia have used reserve requirements to counter credit cycles.

Box 6. Experience with Limits on Loan-to-Value for Residential Mortgages 1/

A number of countries have used limits on LTV ratios to tame housing booms or increase resilience in the face of a bust. This box summarizes this experience with a view to assess whether such ratios can be useful for countries more broadly.

A number of countries have historically or more recently used limits on LTV ratios as a macroprudential tool. This experience is surveyed in Borio and Shim (2007) and Crowe and others (2011b). LTV limits can serve a number of objectives, including reining in booms in mortgage credit and real estate prices; reducing the probability of default when the housing market turns sour; and reducing losses, given default, by increasing recovery values. Before the crisis, several Asian emerging countries used LTV limits to tame real estate booms, while the explicit use of LTV limits in advanced countries has been relatively rare, with Canada and Denmark as the only significant examples.[1] Some countries have also combined LTV limits with limits on debt-to income (DTI) ratios, such as in China, where the introduction of an 80 percent LTV ceiling in 2001 was subsequently followed up with 50 percent DTI limits in 2005–06. These measures were credited with reducing mortgage credit growth to only 2 percentage points of GDP over 2004–08. Hong Kong SAR has had LTV limits since the 1990s that are credited with reducing the fall-out from the real estate bust in 1997. In Croatia, on the other hand, a 75 percent LTV limit had little success as it pushed lending to unregulated sectors, also currently a concern in China.

Since the beginning of the crisis, some countries have introduced new LTV limits. Canada, Malaysia, South Korea, and Sweden have introduced or lowered LTV limits; similarly, a few (mainly Asian) countries lowered eligibility limits as a countercyclical stimulus measure, but this was quickly reversed as renewed capital inflows rekindled fears of real estate booms (Thailand, China).

The IMF survey found that more than a third of respondents recently implemented an LTV limit, while almost two thirds considered it a possible tool. According to the survey, the objectives of LTV limits are to promote financial stability and consumer protection more generally by limiting the spillover risk stemming from the housing sector. While it was deemed too early to assess the effectiveness of the recently implemented LTV limits, countries with a longer experience often saw it as an effective way of dealing with real estate booms.

Due to data limitations, the effect of LTV ratios in controlling real estate prices and mortgage activity is difficult to assess empirically. For example, the coverage of LTV limits can vary widely between countries, for example as to second liens, etc. That said, the existing empirical literature tentatively supports the effectiveness of LTV ratios in taming housing booms. For example, according to Crowe and others (2011), a 10 percentage point tightening in the LTV ratio leads to a decline in house prices of between 8 and 13 percentage points. There is also evidence that LTV limits have an effect on the "financial accelerator mechanism," reducing the transmission from increases in income to increases in house prices (Almeida, Campello, and Liu, 2006). Evidence in Claessens, Kose, and Terrones (2011a and b) also indicate that lower LTV and DTI limits could be required for those markets that tend to suffer deeper recessions with more severe financial downturns.

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1/ Based on Crowe and others (2011b) and IMF (2011b).

2/ IMF (2011a) finds that it is very difficult to find a standardized definition or application of LTV ratios; the available ones do not help explain the cross-country differences in either real house price or financial stability during the crisis or the pre-crisis mortgage debt growth. This would suggest that there is no international consensus on the role and the design of limits to LTV and one should use the LTV-ratios with care.

45. **New tools are also being considered to mitigate systemic risks that arise from common exposures and interconnectedness in the financial system.** Proposals are being

discussed to increase the loss absorption capacity of systemically important financial institutions (SIFIs).[42] Requiring SIFIs to hold higher capital buffers could lessen the spillover impact on others that may result from their failure. There are also proposals that target the systemic risk that may arise out of institutions' common exposures and/or balance sheet inter-linkages. Proposals to address this include a systemic capital surcharge or, possibly, a systemic liquidity surcharge, based on a firm's marginal contribution to systemic risk.[43] A levy on non-core liabilities could also potentially mitigate systemic risk to the extent that institutions that rely on non-core liabilities are more vulnerable the negative spiral that can develop between market and funding liquidity risk. There are proposals to calibrate deposit insurance risk premiums to account for not just the risk of default of individual banks, but also the negative externality that such individual defaults could potentially generate for the rest of the system.[44]

46. **A robust market infrastructure plays a critical role in mitigating systemic spillovers from the failure of individual firms and can complement macroprudential tools**. An important task for macroprudential policy is to introduce measures that discourage excessive direct exposures between, and long chain connections across, financial institutions. An important element is the design and oversight of payment, settlement, and clearing arrangements in a manner that reduces the build-up of counterparty exposures in these systems and hence the potential for spillover from a failure of system participants. Well-known examples in this area are the establishment of Real Time Gross Settlement (RTGS) and Delivery versus Payment (DvP) for national payment and settlement systems, respectively; and the introduction of Payment versus Payment (PvP) in the settlement of foreign exchange transactions via Continuous Linked Settlement (CLS).

47. **A more recent initiative is to minimize systemic risk associated with cascading counterparty failures in the OTC derivatives market by establishing central counterparties for the majority of these trades**. The establishment of new financial infrastructures needs to be complemented by the creation of regulatory incentives to use the new infrastructures, especially when their use is viewed as costly by market participants. To this end, the BCBS has proposed to that for those trades that are not cleared through CCPs, to impose a higher capital charge, thereby creating incentives for their migration to CCPs. In addition, to reflect the risks that those large OTC derivative dealers' books pose to their

[42] See FSB (2010b), G30 (2010).

[43] See IMF (2010a, 2010e, 2011a), and G30 (2010).

[44] See Acharya, Santos, and Yorulmazer (2010).

counterparties and to the financial system as a whole, some have also proposed a direct charge on derivative payables (the amounts owed to others).[45]

48. **National proposals have included structural measures to limit risk concentrations and interconnectedness**. Legal restrictions on permissible activities have been in place at different times in different countries, although not explicitly with a view to addressing systemic risk. Examples include the Glass-Steagall Act in the United States, repealed in 1999, and constraints in place in a number of countries for commercial banks to engage in securities transactions. Recent policy initiatives falling under this category include the "Volcker-rule," which would create a ban on proprietary trading for systemically important U.S. banks; and proposals in the EU to restrict short selling, CDS, or other derivatives transactions in the event of a serious threat to financial stability.[46] Empowering macroprudential authorities to force the break-up of a financial institution when a threat to systemic stability cannot otherwise be contained, is a possibility being considered in the United States.

How should macroprudential instruments be chosen?

49. **The choice of instruments to be included in the macroprudential toolkit should be based on a set of desirable features**. Generally, such features should include: (i) effectiveness in limiting the build-up of systemic risk and creating buffers to be used in periods of stress; (ii) limited opportunity for arbitrage (regulatory, cross-border); (iii) aimed at the roots, not the symptoms of systemic risk (notably by inducing private sector agents to internalize the systemic consequences of their decisions); and (iv) as least distortionary as possible to the financial system and the economy.

50. **In practice, testing instruments against such features has proved challenging.** For the newly developed instruments, the obvious challenge is assessing the effectiveness of measures with no previous history. Evidence on the effectiveness of instruments used by countries in the past remains limited, which was highlighted as a major challenge and area for further work going forward in the IMF survey. Indeed, survey respondents pointed to a number of instruments that could "potentially" be useful, although experience with their actual use is significantly more limited (Figure 3).

51. **As a result, despite considerable discussions on individual instruments, little practical progress has been made on the selection of tools.** There are several aspects to this debate:

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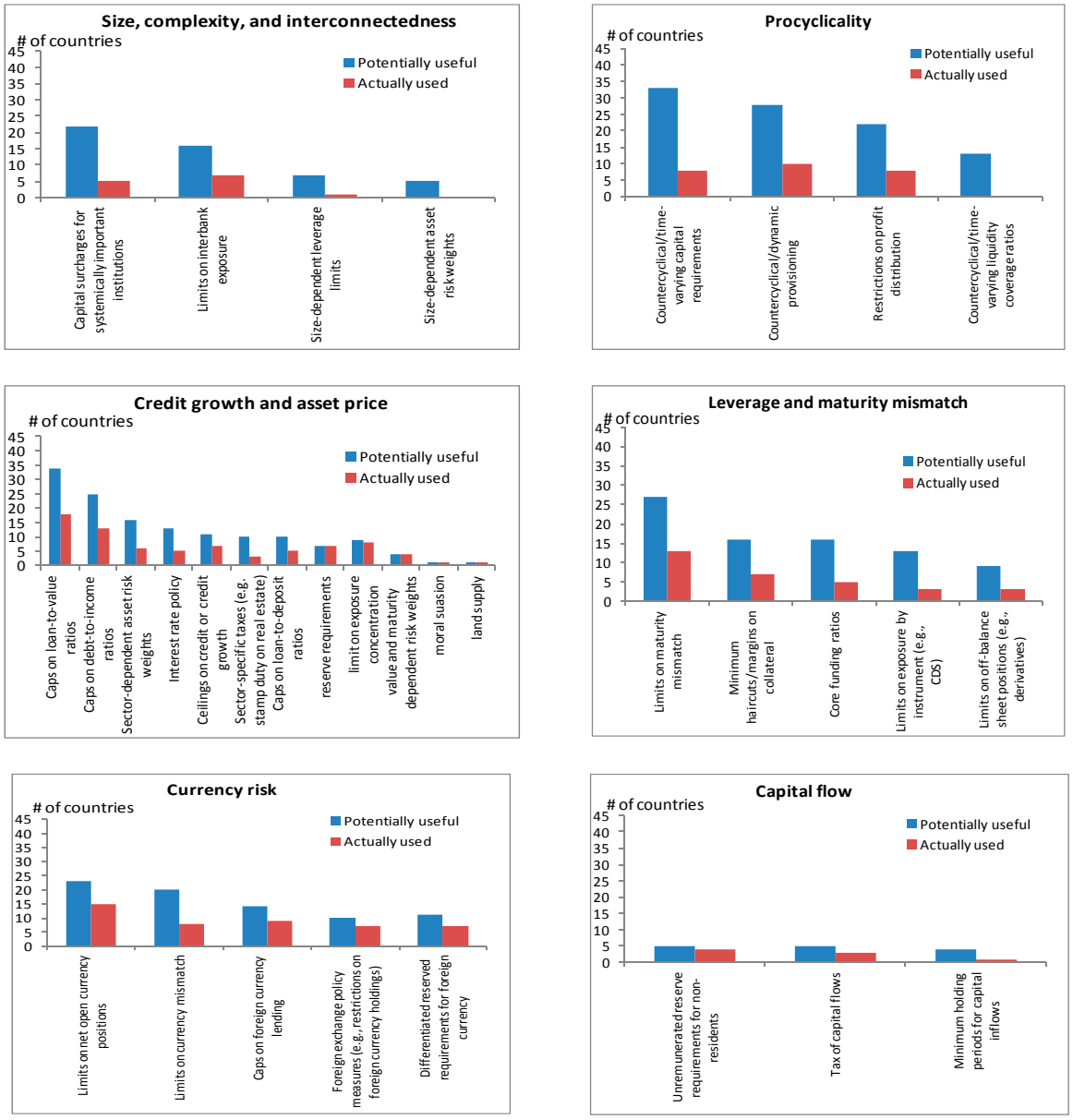
[45] See FSB (2010a), IMF (2010a), Singh (2010).

[46] See G30 (2009).

Figure 3. "Potentially useful" and "Actually used" Instruments



- ***Few or multiple instruments.*** A key argument in favor of a limited set of instruments (which should be at least as many as the objectives) is that it is easier to affect market expectations through a simpler, and therefore more transparent, policy toolkit.[47] Additionally, the lower the number of the instruments, the easier it is to assess the

[47] See BIS (2008).

interactions among instruments and the overall policy impact. The advantage of more instruments is to allow addressing more localized problems. It also helps solve potential policy conflicts related to the use of the same instrument in the pursuit of different policy objectives. For instance, systemic capital surcharges on SIFIs based on their contribution to systemic risk could be transparently calibrated, and send good signals to investors. However, this tool reduces systemic solvency risk not systemic liquidity risk. The latter could be addressed by an additional instrument, such as through-the-cycle haircuts for collaterals used in repo transactions to reduce the risk of fire-sales in the event of liquidity freezes.

- ***Aggregate versus sectoral measures***. Measures to address procyclicality can be designed and calibrated with respect to aggregate or sectoral variables. The main advantage of an aggregate measure is that it is a broader measure of sources of risk and less subject to the danger of straying into credit allocation or industrial policies.[48] The main advantage of a sectoral calibration is that it is more targeted, may better account for idiosyncratic build-up of risks, and less blunt. For example, countercyclical capital charges could be put in place to reduce risk-taking during a boom and ensure sufficient capital buffer during a downturn. Targeted instruments such as countercyclical limits on the LTV ratio could address more specifically a boom in the real estate market.

- ***Institution-based versus market-based***. Institution-based measures apply to subset of financial entities based on their legal form and tend to be simpler to administer. Market-based measures apply to classes of transactions or activities in certain markets, independent of the legal form of the institution that undertakes the activity. The main advantage of this approach is to reduce the scope for arbitrage, although it requires the particular activity or market to be within the perimeter of regulation. For instance, measures to limit credit growth could be easily directed at banks; however, to prevent regulatory arbitrage, one could also reduce aggregate risk by targeting all financial institutions that offer instruments of debt financing.

52. **Other considerations that should affect the choice and combination of policy instruments include country-specific circumstances** (e.g., the exchange rate regime, degree of capital account openness, and breadth and depth of financial system), suggesting that there is no one-size-fits-all solution. Macroeconomic conditions can also affect the choice of tools. For instance, credit cycles can be particularly accentuated by capital inflows in emerging economies, while asset prices play an important role in both advanced and emerging economies.

[48] See Borio (2010)..

How should instruments be used?

53. **The experience from other policy areas, particularly monetary policy, suggests some considerations toward developing best practice**:

- ***Linking tools to objectives***—In principle, one instrument should be assigned to the pursuit of one policy objective, though difficulties in providing an operational definition of systemic risk make this difficult in practice. In particular, there is at the moment no single measure of systemic risk, and significant uncertainty remains around measures of aggregate risk within the time and cross-sectional dimensions.

- ***Rules versus discretion***—A key advantage of a *pre-committed rule* is that it may overcome the bias for inaction that would tend to prevail, if each discretionary action needed to be justified in the face of significant uncertainty in the measurement of systemic risk, and given potentially strong political and market resistance. A rule provides transparency and ex ante incentives to take action during periods of economic booms and busts. On the other hand, the uncertainty on the measurement of systemic risk and the transmission channels of macroprudential tools would also support a d*iscretionary use* of the toolkit.[49] An advantage of discretion is that it allows for flexibility to adjust approaches on the basis of experience and new information garnered.

54. **A mix of rules and discretion may be optimal under current circumstances**. As a mixed approach, a small number of rules-based instruments could be deployed to address the key dimension of systemic risk. For instance, tools such as a countercyclical surcharge could be aimed at constraining firms' behavior in the upturn of a cycle and limit the build-up of systemic risk. In addition, some discretionary policy element would complement the rule by allowing policymakers room to apply additional measures. The difficulty in calibrating systemic risk favors this complementary approach and avoids the downside risks of relying strictly on automatic mechanisms.[50] Discretionary interventions would also be more appropriate to deal with unanticipated sudden systemic shocks, as well as idiosyncratic risks affecting systemic individual institutions or market segments. Discretion could be constrained to assure transparency and an international level playing field (Figure 4).

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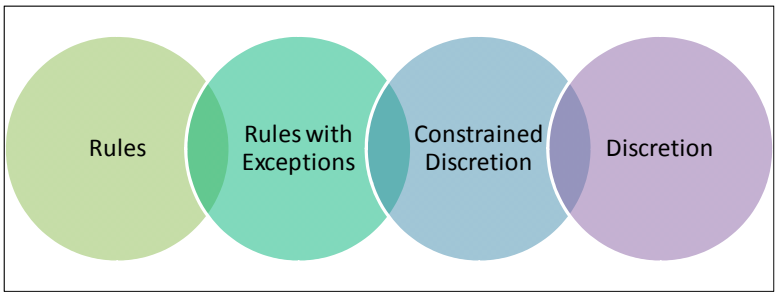
[49] Borio and Drehmann (2009), however, have argued that measurement error is less critical if risk indicators are used to calibrate a rule that is applied across the board to all institutions and the basic direction of the measure is correct. See also CEBS (2009).

[50] Landau (2009).

Figure 4. Rules or Discretion? A Continuum



55. **An additional challenge is developing robust calibration methods.** This remains work in progress, as noted in Section III. Areas for further research include establishing an analytical framework to assess ex-ante possible outcomes of applying a given instrument or mix of instruments; and enhancing the analysis of transmission channels of macroprudential policy. Calibration of macroprudential measures will also need to account for the joint effect of all instruments being applied—micro and macro. Measurement of the benefits, costs, and risks involved and simulation of the possible impact of policies on short- and long-term economic performance are necessary. Policymakers will need to exercise careful judgment in balancing the benefits of greater stability against possible growth and efficiency costs. According to the IMF survey, at present calibration is primarily achieved through a combination of learning by doing, cross-country experiences, and use of quantitative models.

56. **Another important decision is the range of institutions and markets that macroprudential instruments should apply to.** This requires an understanding of the contribution of individual institutions and markets to the build-up of systemic risk. The recent financial crisis showed that build-up in leverage and maturity mismatch risks in the "shadow banking system" and its interconnectedness with the regular banking system amplified both the procyclicality and cross sectional dimension of systemic risk.[51] In principle, macroprudential policies should capture all systemically important providers of credit, liquidity, and maturity transformation regardless of their legal form, as well as systemically important financial infrastructure; and where relevant, appropriate prudential instruments and regulations should be applied to institutions and market activities that may pose systemic risk. This would require redefining the perimeter of reporting and regulation to

[51] See IMF (2010e) for a fuller discussion of the factors that contributed to systemic liquidity stress. Gorton and Metrick (2009), Brunnermeier and Pedersen (2009), and Shleifer and Vishny (2010) also discuss how margin spirals, increases in haircuts on repos, and fire sales affect a firm's ability to borrow, its solvency, and the overall fragility of the financial system.

include all firms that may contribute to systemic risk.[52] It would also help limit the scope for regulatory arbitrage.

57. **A critical challenge in this area is obtaining a full and precise picture of the "shadow banking system" both at a national and global level in terms of their activities and systemic importance**. The funding and investment instruments that make up the shadow banking system (e.g., OTC derivatives, asset backed commercial paper, securitization, and repurchase agreements) as well as the entities (e.g., money market mutual funds, hedge funds, and finance companies) have typically been operating outside the focus of regulation and supervision as well in more opaque markets. In addition, their operations tend to evolve quickly to meet new market demands, making it more difficult to track their activities. These challenges are being currently addressed in the FSB, and the Group of Twenty (G-20) more recently has requested an examination of the contributing role of so-called "shadow banks" to the buildup of systemic liquidity risk.

V. Institutional Set up and Policy Coordination[53]

58. **Design of effective institutional arrangements for macroprudential policy faces a number of challenges.** This section sets out the nature of these challenges, and discusses elements of the institutional design that can help address these challenges, including

- the composition of a macroprudential authority;
- its mandate and powers;
- the mechanism ensuring accountability and communication; and
- the mechanisms ensuring domestic and international policy coordination.

59. **This discussion is not to suggest that there is a one-size-fits-all solution that can readily be adopted by all countries**. Nonetheless, the challenges and trade-offs described below are likely to be relevant for almost all countries to some extent. A general discussion may therefore be useful, even though solutions will also be shaped by a range of country-specific circumstances, including the existing institutional structure and the state of development of the financial system.

What are the main challenges in ensuring effectiveness of macroprudential policy?

60. **A first challenge is that the financial sector evolves dynamically.** As a result, the level, source, and distribution of systemic risk are subject to change. The macroprudential policymaker needs access to information and resources, which allow it to analyze risks and

[52] G30 (2009). The Frank-Dodd Act provides for the creation of a council with decision-making authority over a non-bank that is viewed as systemically important, and gives the Federal Reserve the mandate to intervene.

[53] This section draws on Nier (2011).

evaluate policy responses. It also needs to be able to respond flexibly to risks that are identified. This requires powers to affect the behavior of financial intermediaries and markets, either through direct use of tools vested in the macroprudential policymaker, or by influence over the actions of other agencies.

61. **A second challenge is that macroprudential policy involves managing a tail risk**, the incidence of a financial crisis, rather than an outcome, such as inflation, that is continuously observable. This has several important implications for the design of governance arrangements:

- It shapes the nature of the policy problem faced by the macroprudential policymaker. The benefit of taking an action will be long-term and not visible to the public, while the costs of taking action will often be highly visible and felt immediately. This can create a strong bias in favor of inaction that is further exacerbated when the policymaker is subject to lobbying on the part of the financial industry or political pressures. This puts a premium on institutional arrangements that strengthen policymakers' ability and willingness to act.

- It also constrains the available accountability mechanisms compared to those developed for monetary policy, where an inflation target serves as a benchmark against which the performance of the policymaker can be monitored. This can make it more difficult, politically, to delegate substantial powers to a macroprudential policymaker.

62. **A third challenge is the need for coordination across policy areas**. This is because, as noted in Sections II and IV, the tools of macroprudential policy will likely be, at least in part, shared with other policy areas. While inevitable to an extent, the need for coordination risks reducing further the effectiveness of macroprudential policies, reinforcing existing biases towards inaction.

Who should be represented on a macroprudential authority?

63. **The institutional set-up needs to ensure effectiveness of macroprudential policy, as well as an integrated approach to policy formulation and execution.** The presence of a well-identified authority (an institution or a policy committee) that has a clear macroprudential mandate and a mechanism promoting consistency across policies to preserve financial stability, are the two basic elements of an institutional framework for macroprudential policy, as introduced in Section II. In practice, the arrangements may differ in the extent to which these two elements are distinct or overlap. The results of the IMF survey confirm a variety of existing institutional set-ups related to financial stability and

macroprudential policy in its member countries (see Box 7 and Background Paper). Examples of institutional models that can be observed in practice include the following:[54]

- A model where a specific institution (and its *board*) is given a macroprudential mandate; this is often accompanied by a *coordinating committee*, involving the treasury; coordination can also take place through other mechanisms, such as a requirement to consult;

- A model where a single institution is tasked with carrying out macroprudential policy (analytical and operational), but the decisions are taken by some attached policy *committee*; sometimes such a body also plays the role of a coordinating committee;

- A model where an independent *committee* or *council* fulfils the role of macroprudential authority; usually, due to its composition, it plays a coordinating role too; there can be multiple institutions contributing to the decision-making process of such committee, as well as policy implementation.

64. **These examples show that often, macroprudential policy is conducted through committee or council arrangements.**[55] Aligning the macroprudential authority with a particular institution—and hence its board, as in the first model—is possible when the institution combines the mandate with most of the resources and powers necessary to conduct macroprudential policy. If this institution is a central bank, it usually plays an important role in microprudential policy.[56] In turn, the creation of a separate macroprudential policy committee is most obviously desirable when there is institutional separation between bodies that have a financial stability mandate and agencies with relevant powers, such as the central bank and a separate prudential agency (as will often be the case in the third model). However, a separate policy committee may be useful also when there are close institutional ties between these agencies (as in the second model), both to ensure separate governance of monetary and macroprudential policies and to foster a broader policy dialogue that also involves securities regulators and the treasury.[57] The substantive issue then becomes who should be represented on the macroprudential committee.

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[54] The arrangements in Malaysia, United Kingdom, and Mexico, respectively, come close to the three models.

[55] Indeed, since decisions by any macroprudential authority will in practice typically be made by a policy "committee" or "board", or "council", rather than a single individual, the terms macroprudential "authority", "policymaker" and "committee" are used interchangeably in the remainder.

[56] See Nier (2009).

[57] See IMF (2010b) for further analysis of the relationship between monetary and financial stability policies.

Box 7. The Institutional Set-up across Countries—Some Recent Examples

European Union—The European Systemic Risk Board (ESRB) was established in January 2011. It comprises the ECB, the national central banks of the EU, the three new European authorities on banking, insurance and securities, the European Commission, and the Economic and Financial Committee (representing national treasuries). Its role will be to conduct macroprudential surveillance across the EU and to issue risk warnings and recommendations, so as to contribute to the prevention and mitigation of systemic risks. Recommendations can be issued to any national or supranational authority. Monitoring of follow-up is envisaged through an "act or explain" mechanism and an option on the part of the ESRB to publish its recommendations.

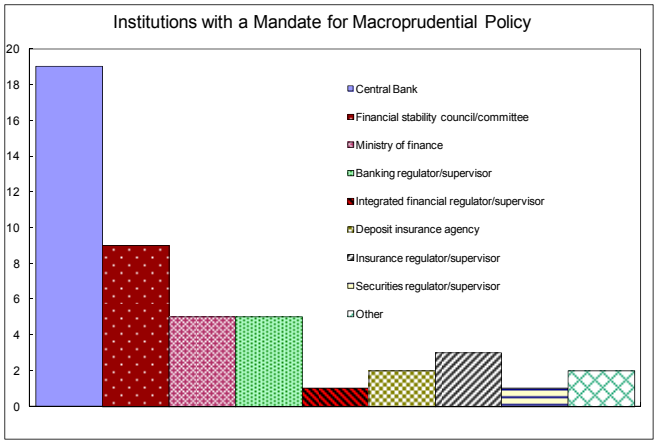
Malaysia—Under the 2009 Central Bank of Malaysia Act, the bank has been given a financial stability mandate and broad powers to ensure financial stability. In addition to powers to regulate and supervise financial institutions and specific markets under its purview, the bank can invoke powers on financial institutions beyond its regulatory reach and make recommendations to any other supervisory authority. Governance for these latter powers is provided by a Financial Stability Executive Committee, chaired by the governor and comprising one deputy governor, and three to five other members appointed by the Treasury—which includes a treasury representative in practice.

Mexico—In July 2010, a Presidential decree led to the creation of the Financial Stability Council, with the aim of creating a formal avenue to boost coordination and information exchange between the country's financial authorities and to enable quick and accurate identification of risks to the financial system. The council is chaired by the Minister of Finance, and comprises the Bank of Mexico, the Secretary of Finance and Public Credit, the National Banking and Shares Commission, the National Commission of Insurance and Finance, the National Commission for the Retirement Savings System, and the Institute for the Protection of Bank Savings. While decisions are expected to be taken by consensus, in the event of policy disagreements within the council, a majority vote would resolve the controversies. However, while each financial authority is responsible for the implementation of the policies comprised within the scope of its legal mandate, in case of disagreement with the council, it cannot be forced into action if that would conflict with its mandate. As part of its communication strategy, the council will issue an annual report about its activities and the state of the financial system.

United Kingdom—The U.K. Government issued a Consultation Paper in July 2010 with a view to establish a new Financial Policy Committee (FPC) within the Bank of England, chaired by the governor, with responsibility for macroprudential policy. A substantial degree of cross-membership is envisaged with the existing Monetary Policy Committee (MPC). A new Prudential Regulatory Agency (PRA) will be established as a subsidiary of the Bank of England, with its chief executive officer a deputy governor of the bank and member of the FPC. The FPC will also include the head of the new consumer protection and markets authority (CPMA) as well as the Treasury, the latter as a non-voting member. Both the PRA and the CPMA will be under a statutory obligation to consult the FPC on any rules that would have material implications for financial stability. The FPC will also be given a set of macroprudential instruments, yet to be determined, and can make recommendations on the regulatory perimeter.

United States—The 2010 Dodd-Frank Act establishes a new Financial Stability Oversight Council chaired by the Treasury and assembling the federal supervisory agencies and securities regulators, including also the Federal Deposit insurance Corporation (FDIC) and the new Bureau of Consumer Financial Protection. The FSOC can issue recommendations to constituent agencies, and plays a coordinating role, while direct regulatory and supervisory authority lies with constituent agencies. The act empowers FSOC to designate non-bank financial companies as systemically important, subjecting such companies to supervision and regulation by the Federal Reserve. It also requires the Federal Reserve to establish enhanced prudential standards for such institutions and establishes mechanisms to resolve these institutions. A new Office for Financial Research (OFR) is established within the treasury, which is empowered to collect information and whose role is to conduct analysis and research for FSOC.

65. **Central banks typically have a prominent role on the macroprudential policy committee**. The IMF survey indicates that the central banks are given a financial stability mandate in most countries (90 percent) that responded to the survey. Due to their existing roles in monetary policy and payment systems, central banks can bring expertise in the analysis of systemic risks that are crucial to inform macroprudential policies. Central banks can bring expertise in monitoring financial markets and the analysis of aggregate and sectoral developments that can be brought to bear in the design of policies designed to reduce procyclicality risks. Their roles in the oversight of payment systems and as lender of last resort, generate further important expertise for the design of macroprudential measures that reduce probability and impact of individual failure. Central bank's analytical expertise can thus help achieve greater clarity of benefits and costs of macroprudential policies.



66. **Central banks also have strong institutional incentives to ensure the effectiveness of macroprudential policies**, because, if macroprudential policies are ineffective, this is costly for central banks.[58] This can manifests itself by the need to do more "leaning," compromising the central bank's main macro objectives, or worse, more "cleaning," providing liquidity ex post, involving considerable costs for central banks.[59] Harnessing the expertise and incentives of central banks can therefore increase both ability and willingness to act. A strong role of the central bank can also create greater *de facto* independence of macroprudential policies.

67. **Prudential agencies need also be included, whether or not they are organizationally linked with the central bank**. This allows an integrated approach to macro and microprudential policy, where policy trade-offs can be discussed and internalized. It can create ownership of any policy action taken by the macroprudential authority when this needs to be implemented by the prudential agency. Inclusion of the prudential authority is important finally to make full use of all available information, for instance as regards systemically important institutions.

[58] See Nier (2009).

[59] Importantly, the central bank's ability to act in crisis situations can invite political pressure, compromising the central bank's independence in the pursuit of price stability. Central banks also often face reputational costs from crises, whether or not they are given the tools to prevent them, see Nier (2009).

68. **The committee may in addition include other financial regulators,** such as the securities market regulator (and potentially the main competition authority)**.** The presence of the securities regulator may be useful in particular where non-banks and securities markets play a major role in providing financial services to the economy. It may be less critical in those emerging markets where the financial system remains essentially bank-based, but could here still be useful to ensure that development does not create systemic risks. On the other hand, as the committee grows, this can slow decision-making and reduce accountability. When several regulators or supervisors are represented on the committee, attention will also need to be paid to ensure that micro considerations do not dominate systemic ones.

69. **Involvement of the treasury in macroprudential policies has benefits and costs and country practice varies.**[60] Treasuries have traditionally played a strong role on policy committees whose main role was in crisis management and resolution. Benefits from their involvement on a macroprudential policy committee include the ease of integration of fiscal and exchange rate policies and, more broadly, of discussion of any legislative changes that may be required to mitigate systemic risks. Treasuries can also play a mediating role when there are conflicts or differences between other agencies represented on the committee. The main cost of an involvement of the treasury is a reduced degree of independence from the political process: the nature of macroprudential policies is to take the "punch bowl" away in good times. Treasuries may be reluctant to do so when this reduces the availability of credit for key constituencies or abundant tax revenues. One way to resolve this trade-off is to have treasuries participate, while ensuring they do not dominate decision-making on the committee.

70. **In sum, conferring the macroprudential authority to a fairly broad committee has benefits and costs**. It can ensure an integrated approach to policymaking, ensuring use is made of all information and policy conflicts are internalized. It can also be useful to ensure visibly separate governance and accountability mechanisms for macroprudential and monetary policy. On the other hand, a committee may have the tendency to slow decisions, especially when its membership is large and the interests of those represented on the committee are diverse. It would also be essential to avoid that a committee structure dilutes accountability, especially as the membership of the committee grows, as discussed below. In general, advantages and disadvantages of specific institutional forms for the macroprudential policymaking require further analysis.

What should be the mandate and powers of the macroprudential authority?

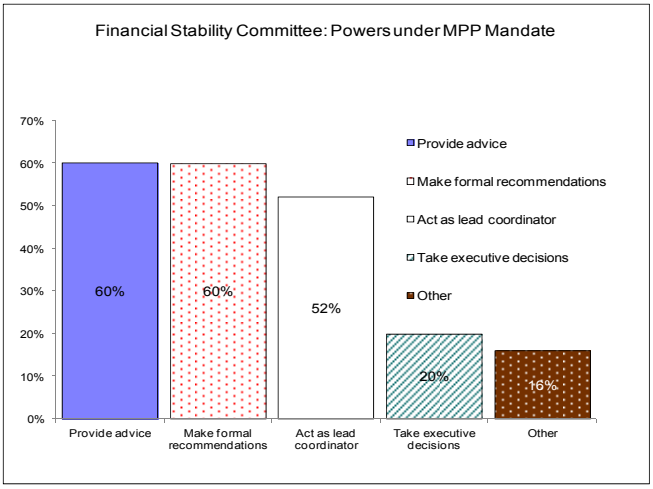
71. **A dynamic financial system requires powers on the part of the macroprudential policymaker**. A static set of rules and regulations risks being outpaced and eventually overwhelmed by a dynamically evolving financial sector. The macroprudential policy framework must instead enable a flexible response. Three types of powers will be needed:

[60] For example, in the United States, the Treasury chairs the FSOC, while in the United Kingdom, the Treasury has an observer status only on the FPC.

(i) information collection powers; (ii) designation powers; and (iii) rulemaking and calibration powers. As discussed further below, the need for powers can translate into the need for some degree of influence over the actions and powers of constituent agencies.

72. ***Information collection powers***. Macroprudential policy needs to start from a periodic assessment of systemic risks across the financial sector, necessitating access to information. The authority will typically require access to regular supervisory data, to assess systemic risks from the failure of individual firms as well as risks that build up across the financial system.[61] The authority should, in addition, be given the power to request and collect information directly from firms, so as to assess the contribution to systemic risks of firms that are not otherwise subject to supervision and regulation.[62]

73. ***Designation powers***. The macroprudential authority needs to have the power to bring within the scope of its policies all individually systemic institutions, importantly including non-banks and financial infrastructure providers, such as central counterparties.[63] The macroprudential authority also needs to have the power to bring within scope of its policies all institutions that generate risks related to the procyclicality and that may therefore be collectively systemic. These powers need to apply irrespective of legal form, to include important non-bank financial intermediaries.[64]



74. ***Rulemaking and calibration powers***. A framework that enables the choice of policy instrument and the calibration of policy action to *be conditioned on* the source and the level of systemic risk is likely to be more efficient than a static set of rules that is set out once and

[61] As provided for the ESRB, who will have access to supervisory data available to the new European Banking Authority (EBA). The ESRB can also use existing powers available to the European Central Bank (ECB) to collect statistical information.

[62] Such a power has recently been provided in the United States to the Office of Financial Research (OFR). The OFR's mandate is to collect and analyze information on behalf of the FSOC.

[63] In the United States, the FSOC is empowered to designate non-bank financial companies as systemically important, subjecting such companies to supervision and regulation by the Federal Reserve.

[64] In the United Kingdom, the FPC will be empowered to make recommendations to the treasury on any changes the FPC believes necessary to the regulatory perimeter. See HM Treasury (2011).

for all in primary legislation. This points to the need for the macroprudential authority, or its constituent agencies, to have substantial rulemaking and calibration powers. This does not imply, however, that *all* financial rulemaking powers be vested in it, given the risks of politicization that this might entail in particular country circumstances and in order to avoid conflict with other policy areas.

75. **The use of powers vested in the authority needs to be guided by a strong mandate that *opens up* and at the same time *constrains* the discretionary use of powers.** This can be achieved by setting out in law the primary objective of the macroprudential authority-—to safeguard systemic stability, so as to reduce the probability and severity of financial crises. Clearly subordinated secondary objectives could also be considered to ensure the policymaker fully considers trade-offs in the pursuit of financial stability, because macroprudential action inevitably involves costs as well as benefits. These could include the need to ensure protection of depositors and investors, or to maintain a level of financial services conducive to the balanced growth of the economy. Introducing the secondary objectives, one has to assure that it will not be used to compromise the primary one.

How to ensure accountability of the macroprudential authority?

76. **Accountability arrangements for macroprudential policy cannot fully mimic those developed for monetary policy, but can incorporate key elements.**[65] For both monetary and macroprudential policies, political economy considerations favor strong operational independence from the political process. However, the design of accountability mechanisms for macroprudential policies faces the constraint that the benefit of macroprudential policies—reduction of the probability and severity of a future crisis—cannot be measured with precision. This means that accountability mechanisms for macroprudential policy cannot copy those of monetary policy for example where an inflation target serves as a yardstick for judging the performance of the monetary policymaker.

77. **Transparency and the clear communication of policy decisions to the public is a central element of accountability.** Such communication can set out in detail the reasons for taking a particular course of action and give a detailed account of the analysis and deliberations undertaken by the authority, including an assessment of benefits and costs. Communication of particular decisions may be complemented by a periodic report to parliament, perhaps in the form of an annual or semi-annual report, or a financial stability report issued to the public.[66] Additionally, communication should be given special attention

[65] Similar considerations do apply to financial policies. See in particular, IMF (1999).

[66] Regular reports to the public and parliament are a feature of the accountability mechanisms in the EU, the United Kingdom, and the United States.

as information frictions are one of the key sources of market failures.[67] Effective communication policy can be key to initiating self-corrective market mechanisms in the course of build-up of systemic risk.

78. **Communication of risk warnings and assessments can increase both effectiveness and accountability.** It can increase policy effectiveness when warnings are backed up by a credible threat on the part of the authority to take macroprudential action. In this case, the publication of risk warnings can in and of itself lead to changes in behavior of markets and institutions, potentially reducing the need for more intrusive intervention. Communication of risk warnings can also increase accountability, since they serve to create commitment on the part of the macroprudential authority or its constituent agencies to take follow-up action. Communication of risk warnings, however, needs to avoid the impression that the authority is attempting to predict crises.[68]

79. **Public accountability can be further increased by creating transparency of internal decision-making processes** in two main ways and again drawing on the example of monetary policy. First, where formal advisory and technical committees consisting of experts are set up, it can be useful to ensure transparent communication of their analysis and recommendations to the main macroprudential authority. Second, there may be a benefit in creating transparency on the positions taken on major policy decisions by individual members of the macroprudential committee.

What mechanisms can ensure domestic policy coordination?

80. **The need for policy coordination arises for two reasons.** First, macroprudential instruments are often shared with other policies; second because formal control over tools affecting systemic risk may rest with authorities other than the macroprudential one. This raises the question as to the appropriate degree of influence over the action of those other bodies. An increasing degree of influence may range from an informal exchange of views in the context of a purely consensual approach—facilitated by the establishment of a coordinating council, through the requirement for formal consultations and the ability of the authority to issue formal recommendations—backed by mechanisms to ensure follow-up, such as "comply or explain"— to a set-up where some constituent bodies are made fully accountable to the macroprudential committee. The appropriate solution is shaped in part by the degree to which objectives of constituent agencies are well aligned, different or even competing, which in turn will vary across the policy fields discussed in Section IV. It also

[67] See Bank of England (2009).

[68] Communication of the overall level of systemic risk can lead to reputational risks on the part of the authority as well as counterproductive market responses that amplify prediction errors. When risk is erroneously assessed as low, communication can lull market participants and stimulate a further build-up of risks. When risk is erroneously assessed as high, it can provoke market responses that precipitate a crisis.

has to respect existing governance and accountability mechanisms for specific policy tools. The optimal degree of influence is likely to be low for monetary policy, intermediate for fiscal policy, competition policy and securities regulation, and strongest for prudential policies.

81. ***Monetary Policy***. The primary objective of monetary policy needs to remain the maintenance of price stability, with financial stability at most a secondary objective. This calls for separate governance of monetary and macroprudential policies.[69] The macroprudential authority should not be in a position to recommend changes in the monetary policy stance, such as a change in the policy rate, as such recommendations can conflict with the primary monetary policy goals and undermine monetary policy independence. However, the macroprudential authority should discuss and take account of the financial stability risks connected with a given monetary policy stance in formulating its policies.[70] Monetary policymakers in turn, may want to take account of action or inaction on the part of the macroprudential authority when calibrating monetary policy. Mutual internalization of policy action that is conducive to an optimal policy mix can be more readily achieved when the central bank plays a strong role on the macroprudential authority.

82. ***Fiscal policy, competition policy, and securities regulation***. While the general fiscal stance needs to be decided by the treasury—and ultimately parliament—for specific fiscal instruments, such as taxes and subsidies that affect incentives to take on leverage, the macroprudential authority could issue advice or formal recommendations. Similarly, for regulations and decisions issued by securities regulators and competition authorities that affect the structure of the financial industry, it would seem important for the macroprudential authority to be formally consulted, to ensure systemic implications are taken due account of. What is more, it may be useful to vest specific powers in these domains directly in the macroprudential authority or its constituent agencies, so as to ensure they can be used to further financial stability objectives. An example from the fiscal sphere is the calibration of a levy on banks' non-deposit funding, when its main objective is to address systemic externalities, rather than create general revenue.[71] An example related to competition policy is the creation of powers to force the divestment of business lines on the part of systemically

[69] See IMF (2010b). A change in monetary policy is a blunt tool that cannot be specifically targeted at reducing systemic risk, but will affect the economy at large. Recent research also suggests that the impact of policy rates on the build-up of imbalances within the financial system is weak, e.g., Merrouche and Nier (2010). This calls for the use of macroprudential tools that specifically target systemic risks.

[70] It is open to debate whether these discussions should be made public.

[71] As suggested by Goodhart (2010). This may not be desirable when the impact of changes in tax rates on the overall fiscal budget is substantial and may not be feasible when the constitution reserves for parliament the ability to raise taxes. On the other hand, in many countries, a deposit insurance agency is provided similar powers to charge and vary a levy on insured deposits, which typically flows into a dedicated fund, rather than the general revenues.

important institutions, so as to avert threats to financial stability. An example from securities market regulation is margin requirements, whose dynamic calibration could be vested in the macroprudential authority and implemented by a constituent securities market regulator.

83. ***Prudential policy***. Cooperation between macro and microprudential policy is most important but also most challenging, given that their core instruments have the same roots.[72] In addition, what matters for the efficiency of both policies is its combined impact. One key difficulty is that prudential policy has multiple objectives (depositor protection and mitigation of systemic risk). When this gives rise to conflicts, a need may arise to establish a clearer hierarchy of policy objectives: mitigation of systemic risk on the one hand, and depositor (investor) protection on the other. A further challenge is how to better align the goals of the macroprudential authority and the microprudential regulator, while preserving the operational independence of the latter–a topic requiring more in-depth analysis.

84. **The management of risks from capital inflows straddles a number of policy areas, including fiscal, monetary, and prudential policies**.[73] A macroprudential authority will often be involved in the policy response. While it will need to take as given many of the macroeconomic determinants of capital inflows, including notably the monetary and fiscal stance and the exchange rate regime, it can play a key role in helping to address systemic financial risks and vulnerabilities associated with capital flows, using primarily prudential tools.[74] In general, capital controls and prudential tools designed to affect capital inflows or other macroeconomic variables should only be used when a macroeconomic policy response is not sufficient. Other prudential tools that target risks within the financial sector can of course be used at any time, and only these should normally be considered as "macroprudential". More broadly, any use of capital controls also needs to take account of obligations arising from international legal instruments, as well as the effectiveness and multilateral implications of these measures.

How can international cooperation complement the domestic institutional set-up?

85. **The crisis revealed the extent and nature of financial interconnectedness between countries.**[75] International cooperation in macroprudential policies is needed not only to limit arbitrage opportunities among cross-border firms, but also to better understand spillovers in risk-taking and financial cycles across borders. The rapid financial globalization of the past three decades has been accompanied by an increase in financial interconnectedness.

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[72] In the case of highly concentrated banking or financial systems, even defining the boundary between the two policies can be a challenge.

[73] See Ostry and others (2010) and IMF (2011b).

[74] See FSB-IMF-BIS (2011).

[75] See IMF (2010f).

Countries have become more and more inter-linked with each other, particularly since the mid-1990s, as the asset and liability management strategies of their sovereigns, financial institutions, and corporations have become increasingly global in nature. In a highly interconnected world, as agents typically fail to take account of the effects of their actions on others, the potential for systemic risk rises.

86. **International and regional cooperation can increase the effectiveness of policies taken at the national level.** Cooperation in macroprudential policies can reduce the scope for international arbitrage that may otherwise undermine the effectiveness of national policies, for example, when tight requirements on domestic banks lead to a provision of credit by foreign lenders. A key example is the principle of reciprocity embedded in the new countercyclical buffers agreed by central banks and supervisory authorities. Cooperation in macroprudential policies can indirectly mitigate the risk of cross-border distortions and spillovers that can otherwise arise from overly forceful unilateral action, such as the imposition of capital controls. International cooperation is needed also to contain the risks posed by systemically important institutions that operate across borders, including through the new supervisory and resolution colleges for cross-border firms.

87. **International and regional cooperation can also buttress the governance of national macroprudential policies through minimum standards, complemented by guidance on, and surveillance of, national action**.

- First, minimum standards and guidance issued by international standard setters under the auspices of the FSB can strengthen the hand of national macroprudential authorities and bolster their resolve to take action. Since minimum standards cannot be fully tailored to country-specific circumstances, they are usefully complemented by comprehensive guidance that can point to additional factors that should be considered by national authorities, but are not fully captured by the standard itself. [76]

- Second, minimum standards and guidance issued by international standard setters are usefully complemented by international surveillance of macroprudential policy. Such surveillance can strengthen the resolve of national authorities to take action. It can ensure proper implementation of international minimum standards and complement general guidance by specific advice on policy options that takes full account of country-specific circumstances. Such surveillance can also make it more likely for national macroprudential policies to "add up" to produce global financial stability. The Fund is well-placed to take a leading role in both regards, especially as the G-20 has recently called for mandatory FSAPs for systemically important countries and upgraded the Fund's role in "coordinating" the process of reduction of global imbalances" (MAP).

[76] Good examples are the BCBS proposals for an increase in dynamic capital buffers when credit growth is strong relative to its trend, where a minimum standard is complemented by comprehensive guidance.

VI. KEY TAKEAWAYS AND WORK GOING FORWARD

88. **Advancing the development of macroprudential policy frameworks poses an array of challenges to national policymakers.** The experience of the crisis has shown that public policy needs to focus explicitly on systemic risk, and this paper makes it clear that much work is needed to fill this gap. Developing a macroprudential framework requires advancing the agenda on analytical frameworks for assessing systemic stability, developing of new instruments, and furthering work on interactions between macroprudential and other policies—notably (micro) prudential and monetary policies. Not least, the conduct of macroprudential policy needs to be underpinned by appropriate governance arrangements. The agenda is not just for advanced countries that were at the center of the crisis, but for other advanced and emerging economies as well. The Fund is well-positioned to support countries advance this agenda because of its global reach, expertise across policy areas, and ongoing dialogues with member countries.

89. **In setting the agenda for further work, it is useful to reflect on the key takeaways from the work that have been conducted to date**. Given the partial state of knowledge in this area, as highlighted in this paper, it too early to develop a set of principles of good practices that could support internationally consistent implementation of macroprudential policies. At the same time, some preliminary views can be offered on key aspects of macroprudential policymaking. Such elements were summarized in Box 1.

90. **Going forward, the Fund will continue to work with national authorities and international bodies on furthering the macroprudential agenda.** The Fund is already engaged with the FSB and BIS, and will report jointly to the G-20 Leaders at their Summit in November 2011 on progress in developing macroprudential policy frameworks. The Fund will continue to refine its assessment of system-wide risks, including through its regular bilateral and multilateral surveillance, the FSAP, and the IMF-FSB Early Warning Exercise. These efforts focus on the identification of common exposures, risk concentrations and interlinkages within and across financial systems, and on the build-up of macroeconomic and financial imbalances, both domestically and globally. The Fund is also increasingly focusing FSAP assessments and technical assistance activities on institutional and analytical elements of macroprudential frameworks.

91. **The Fund, due to its critical role in the bilateral and multilateral surveillance, extensive technical advice to its member states and its role in the G-20 process, should contribute to further the analytical agenda**. In particular, there are several areas where the Fund should focus its contributions:

- The highest priority in the near-term is to identify international good practices that can serve as a basis for formulating practical macroprudential advice to members. This will require more empirical work on country-specific and cross-country case studies. This should allow identifying country or region-specific conditions that may

affect the choice and effectiveness of specific policy measures, which would inform Fund advice to member countries on the implementation of macroprudential policy frameworks.

- With respect to the measurement of systemic risk, priorities include enhancing the capacity to capture risks in a forward looking manner; more robust assessments of the likelihood and impact of shocks; and better "mapping" of risk monitoring tools to policy responses. The Fund has already a number of initiatives in train to improve analytical tools and fill gaps with respect to data needed for the analysis of systemic risks.

- Policy instruments is the area of the macroprudential toolkit that is least developed, both in terms of instrument design and back testing. Priorities for future work include: the choice of tools and their combination into a meaningful framework, the optimal tool mix, robust calibration methods, and the interaction of instruments across policy areas. The role of communication as a macroprudential policy measure is also an important field of research. More in-depth analysis of the effectiveness of macroprudential instruments that have been used in the past is also required.

- A key question with respect to the governance of macroprudential policy is whether and how the macroprudential authority should influence tools not assigned directly to it. Special attention should be given to interactions of macroprudential policy with microprudential as well as monetary policy. A related question is how policy conflicts should be resolved if and when they arise.

- Because each public policy bears some cost, it will be important to assess the costs and benefits of macroprudential policy. Macroprudential policy is closely related to other public policies through common goals, common instruments, and common sources of risks. Hence, attention needs to be paid to the possible side-effects of this new area of policy vis-à-vis other policies.

- Finally, more work is needed on the multilateral aspects of macroprudential policy. Because financial systems are global, there can be distortions and spillovers from implementing macroprudential policies. Areas of focus need to include the analysis of financial cycles across countries; how to apply macroprudential instruments to globally active banks, and their effects; and the scope for cross-border arbitrage. The possible modalities of cross-border cooperation in implementing macroprudential frameworks also require further study.

Issues for discussion

- Do directors agree with the definition proposed by staff of macroprudential policy and its objectives, key elements, and boundaries with other public policies?

- Do directors agree with the role of macroprudential policy in the policy framework aimed at preserving financial stability?

- Do directors agree with the staff assessment of existing knowledge gaps related to the analytical, as well as the operational toolkit of the macroprudential policy?

- Do directors agree with the staff assessment of key aspects of accountability, governance, and transparency of the macroprudential policy?

- What are directors' views on the challenges related to the implementation of macroprudential policy, especially potential policy conflicts within a country, and ways to encourage cooperation across national policies that have a bearing on financial stability?

- Do directors agree with the areas proposed for further work, including analytical and research efforts by the Fund?

- What are directors' views on the role of the Fund in developing a macroprudential policy framework, as well as promoting international cooperation and coordination of national policies in this area?

APPENDIX I. FINANCIAL STABILITY AND MACROPRUDENTIAL POLICY SURVEY: A SUMMARY

92. **MCM conducted a survey in December 2010 to take stock of international experiences with financial stability and the evolving macroprudential policy framework**. The survey was designed to seek information in three broad areas: the institutional setup for macroprudential policy, the analytical approach to systemic risk monitoring, and the macroprudential policy toolkit. The survey was sent to 63 countries and the ECB, including all countries in the G-20 and those subject to mandatory FSAPs. The target list is designed to cover a broad range of jurisdictions in all regions, but more weight is given to economies that are systemically important. The response rate is 77 percent. This note provides a summary of the survey's main findings. A more detailed analysis is in the Background Paper.

93. **Responses to the survey provide a clear indication that macroprudential policy is becoming an overarching public policy in the wake of the global financial crisis**. It is considered to involve the authority, and use the tools, of prudential, monetary, fiscal, and competition policies. A rich repertoire of policy actions are cited—many date back to long before the global crises but are now categorized as macroprudential policy actions. The perimeter of macroprudential policy is expansive but not clearly defined, and the interaction between macroprudential policy and other public policies are not very well understood.

Several important themes have emerged from the survey:

94. **The conduct of macroprudential policy is a multi-agency, consensus process.** The macroprudential policy framework is still embryonic, but the policy perimeter prescribed by respondents is quite extensive. In a majority of the jurisdictions, the macroprudential policy mandate is shared among several public agencies including the central bank. The conduct of macroprudential policy is based on consensus and any policy disagreement is resolved through discussion and negotiation among the various agencies involved.

- The central bank is either the sole institution with the financial stability mandate, or shares the mandate with one or more other agencies, in an overwhelming majority of the jurisdictions.

- Fewer than half of the jurisdictions have a formal mandate for macroprudential policy, and a larger proportion of emerging market economies than advanced economies has it. A majority of those without a current mandate have, or are considering, plans for such a mandate.

- Macroprudential policy is operationally defined to limit, mitigate or reduce systemic risk, but there is no mention of crisis management as a function of macroprudential policy.

- The macroprudential policy mandate is usually shared between the central bank and at least one other public agency such as the financial regulator or the ministry of finance (up to five agencies in some jurisdictions).

- A financial stability committee is a way to institutionalize macroprudential policy coordination, but the committee plays largely an advisory role in the majority of jurisdictions.

95. **A variety of indicators and quantitative models/tools is used for systemic risk identification, monitoring, and assessment.** The indicators cover both the domestic and international aspects of the financial system, and include macro, micro, and sectoral variables ranging from bank capital and performance to market liquidity and household indebtedness. The use of quantitative models and tools is widespread.

- Asset quality and liquidity indicators are considered the most important, with banks' non-performing loans to total loans and the ratio of liquid assets to short-term liabilities the most frequently cited.

- Emerging market economies are more concerned about currency risk and capital inflows, and use indicators such as net open position in foreign exchange to capital and net private capital inflows (as a percentage of GDP) more often.

- Views on leading indicators diverge and few indicators are identified as leading indicators and used operationally as the basis for macroprudential policy decisions. The most frequently cited forward looking indicator is credit growth or credit to GDP.

- The most extensively used models are single institution risk models while stress testing is also quite popular.

- Quantitative models and tools are useful but have their limits, and data availability is cited as a major factor limiting the models' usefulness. For some emerging market economies, the lack of model building skills is also a constraint.

96. **Macroprudential policy is viewed as having a wide range of instruments**. The toolkit contains most notably prudential tools but also tools of monetary, fiscal and competition policies. A large majority of jurisdictions believes that the policymaker can choose a combination of the tools to achieve macroprudential objectives, and the proportion is larger for emerging market economies than for advanced economies. Many of the instruments have been in use for a long time, although evaluating the effectiveness of specific instruments is a complex and difficult task.

- The most frequently used instruments are restrictions on the LTV ratio, limits on net open currency positions, and caps on debt-to-income ratio. The tools are used more frequently by emerging market economies than by advanced economies.

- A small number of emerging market economies has used tools that target non-residents, including unremunerated reserve requirements for non-residents, taxation of capital flows, and minimum holding periods for capital inflows.

- The use of many of the instruments is not new, but they have been calibrated more frequently since the global crisis, indicating their growing importance in the evolving macroprudential policy framework.

- Most jurisdictions strive to choose instruments that are simple, effective and easy to implement with limited cost to financial institutions and minimal market distortions.

- The countercyclical capital buffer is considered susceptible to regulatory arbitrage, and many emerging market economies consider large capital inflows caused by quantitative easing in advanced economies a challenge.

- Regulatory arbitrage, both across borders and across segments of the financial system, is a challenge.

APPENDIX II. LOOKING FOR A MODEL OF MACROPRUDENTIAL POLICY

97. **What is macroprudential policy? Answering this question is no easy task.** The terminology currently in use in unclear and member countries' responses to the IMF Survey suggest wide variations in practice, as national policymakers use the term "macroprudential" to refer to a large variety of goals and instruments. Delineating macroprudential policy from other policy areas is also a challenge, as this policy area is closely related to others by common goals, common instruments, and common sources of risks. As a result, the boundaries between policies are sometimes blurred and difficult to identify—in terms of both "cross-sectional boundaries" (e.g., scope of risk to be addressed by the policy, range of instruments) and "time boundaries" (crisis prevention or also crisis management).

98. **Macroprudential policy seeks to limit systemic, or system-wide, financial risk**. In principle, no *systemic risk* should be left undetected and unaddressed by public policy. However, such this be done by macroprudential policy itself (by applying a potentially large range scope of instruments to address all sources of systemic risk) or by macroprudential policy (with limited of instruments) in coordination with other polices? The economic literature as well as current policy practice does not provide good guidance in this field. On one side of the debate, there is a narrow definition of macroprudential policy as a missing dimension of prudential policy; on the other side, many tools of monetary, fiscal, competition, and exchange rate policies are being referred to by policymakers as being macroprudential. They are labeled this way, while being used to meeting the financial stability objectives, but also, in some cases, other policy objectives (e.g., monetary policy ones).

99. **Macroprudential policy should deal with the sources of systemic risk within the financial system.** The question is which instruments are needed for this purpose. Restricting the toolkit to prudential instruments could pose challenges. For example, is the power to split up financial institutions to deal with risks concentrations a prudential instrument, or is it typically, a competition policy tool that is now being deployed with macroprudential objectives? Similarly, is it realistic to believe that "expanding the perimeter of regulation" will satisfactorily address the build-up of systemic risk outside of the regulated financial sector (and if not, what other policy tools would be available?)

100. **It is less clear whether macroprudential policy should deal with systemic risks generated outside the financial system**. They should be addressed by public policy, but whether this is called macroprudential policy overall, or macroprudential policy narrowly defined operating in conjunction with other policies, is a matter of debate.

101. **There are three possible models of macroprudential policy** (Table 2). The models differ in the scope of the sources of risks to be addressed, the range of instruments at the direct disposal of the macroprudential authority, and the related need for cooperation with other policy areas in meeting the macroprudential policy objective. Each model extends the scope of the focus and tools of the macroprudential policymaker.

Table 2. Models of Macroprudential Policy

Name	*"prudential model"*	*"eclectic model"*	*"overarching policy model"*
Instruments at the disposal of macro prudential authority	Prudential tools	Prudential and specific designated other policy tools 1/	None directly, all of them indirectly through coordination between authorities
Prime focus	The regulated financial sector	The whole financial system (regulated and unregulated sectors) and potentially beyond, depending on designated instruments	Potentially the whole economy (financial and non-financial sectors)
Nature of the *macro*prudential policy	A missing dimension of prudential policy	A "systemic" policy (a new category of macropolicy)	A pure coordination framework of policies sharing a common, macroprudential policy objective in addition to their traditional objectives
Key question	What should be the perimeter of prudential regulation?	Which non-prudential tools should be assigned to macroprudential policy?	How to assure efficient realization of macroprudential policy objective by other policies given their other existing policy goals?

1/ "Specific designated tools" means that some instruments previously used by other policies would be reassigned and placed in a disposal of the macroprudential policy, e.g., credit limits from the monetary policy, some tax instruments from fiscal policy, the power to split financial institutions from the competition policy, capital controls from the exchange rate policy.

102. **The "optimal" policy model should be the most effective in containing systemic risk.** In addition, it should not undermine the objectives of other public policies. Five criteria can be used to conduct such an assessment:

- ability of the public policy framework to effectively address various sources of systemic risk;
- clarity of responsibility for containing systemic risk and incentives to act;
- likelihood that the processes that generate systemic risk are not addressed effectively (e.g., by falling in-between various policy areas);
- changes needed in other policies' goals and operational frameworks to incorporate the macroprudential policy objective (which can lead to sub-optimal outcomes in realization of other public policy goals); and
- scope for "tools competition" across policies (e.g., which model will bring the lowest likelihood of conflicts with other policies).

The results of the assessment of the potential policy models by applying criteria specified above are presented in Table 3.

103. **In sum, each of the above models has relative strengths and weaknesses**. Without applying subjective weights to specific criteria, it is not possible to make a choice. The clarity of responsibility is greater in the case of a clearly identified macroprudential authority, as opposed to purely a coordination mechanism between existing authorities. When it comes to the instruments at the disposal of the macroprudential authority, the prudential model is confined primarily to the regulated financial system. Extending the range of tools beyond prudential ones, as would be the case on a selective basis case in the eclectic model, would potentially expand the scope to address systemic risks beyond the regulated financial system, but this would come at the price of a greater need to change the operational frameworks of other policy areas.

104. **To build a policy framework that combines the strengths and limits the weaknesses of the models analyzed, elements of the three models should be combined**. The outcome of this exercise—a preferred macroprudential policy model and its defining elements—is presented in Section II of this paper.

Table 3. An Assessment of the Models

Criteria/ models	*"prudential model"*	*"eclectic model"*	*"overarching policy model"*
Ability to address systemic risks in the regulated financial system	Yes	Yes	Yes
Ability to address systemic risks in the unregulated financial system	No – prudential policy by definition relates to regulated part of financial system only	Yes	Yes
Ability to address systemic risks in the macroeconomic and international environment	No – prudential policy by definition only relates to regulated financial system	Yes/No - depends on which non-prudential tools will be assigned to MaPP	Yes
Clarity of responsibility and incentives to act	Yes/No *yes* - if the risks are in the regulated financial system, *no* - if the source of risks are outside the regulated sector of financial system	Yes/No *yes* – there is one decision maker responsible for addressing all sources of systemic risk (depending on scope of non-prudential tools assigned)	No – the existence of coordinating body does not ensure agreement on the use of tools, if meeting MaPP goals is connected with compromising other policy goals
Avoiding systemic problems falling between the policies	Yes – there is one center of command and defined set of instruments	Yes- one command center, using only selected designated tools of other policies should not result in policy conflict	No – shared responsibility, lack of direct measures to force policy action, other policy goals, coordination process may fail
Need to change other policies' goals	No	No	Yes – if all policies should be responsible for containing systemic risk, their goals should be redefined
Need to change the operational frameworks of other policies	Yes - MiPP is to be aligned with MaPP or lose some tools to MaPP	Yes - MiPP and other assigned non-prudential policy tools to be aligned with MaPP or transferred to MaPP	Yes – sharing responsibility for containing systemic risk can require changes in other policy frameworks
"Competition" for instruments	No/Yes *no* – theoretically tools are add-ons or complementary to MiPP tools *yes* – in practice there can be a conflict between MaPP and MiPP using the same tools, especially during a bust	Yes/ No *yes* – see comment to "prudential model" *no* - using only selected, designated tools of other policies should not result in policy conflict	Yes – instrument of other policies will be used for meeting MaPP goals

MaPP: macroprudential policy; MiPP: microprudential policy

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