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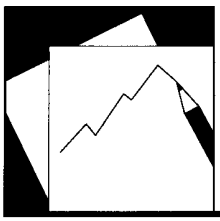

IMF Working Paper

Towards Effective Macroprudential Policy Frameworks: An Assessment of Stylized Institutional Models

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Abstract

A number of countries are reviewing their institutional arrangements for financial stability to support the development of a macroprudential policy function. In some cases, this involves a rethink of the appropriate institutional boundaries between central banks and financial regulatory agencies, or the setting up of dedicated policymaking committees. In others, efforts are underway to enhance cooperation within the existing institutional structure. Against this background, this paper provides basic guidance for the design of effective arrangements, in a manner that can provide a framework for country-specific advice. After reviewing briefly the main institutional elements of existing and emerging macroprudential policy frameworks across countries, the paper identifies stylized institutional models based on key features that distinguish institutional arrangements. It develops criteria to assess the effectiveness of models, examines the strengths and weaknesses of models against these criteria, and explores ways to improve existing setups. The paper finally distills lessons and sets out desired principles for effective macroprudential policy arrangements.

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I. INTRODUCTION

A number of countries are reviewing their institutional frameworks for financial stability so as to support the development of a macroprudential policy function. The high cost imposed by the recent financial crisis in many advanced economies has underscored the importance of establishing effective macroprudential frameworks to prevent the buildup of systemic financial risks. In some cases, countries are rethinking the appropriate institutional boundaries between central banks and financial regulatory agencies, or are setting up dedicated policymaking committees. In others, efforts are underway to enhance cooperation within the existing institutional structure.

This paper builds on the work of the IMF policy paper on *Macroprudential Policy: An Organizing Framework (IMF 2011a),*[2] and responds to the IMF Board recommendation that "more needs to be done to establish criteria for assessing the effectiveness of different institutional setups for macroprudential policies."[3] Indeed, while macroprudential policy has received significant attention in the literature, most emphasis has been placed on recognizing and assessing systemic risks and on identifying the instruments that should be part of the macroprudential policy toolkit.[4] The design of the institutional setup for macroprudential policy has received less consideration.[5]

The IMF has a strong interest in ensuring that effective macroprudential policy frameworks are present in all countries. Effective arrangements enabling the authorities to take preventive action are desirable for all countries, emerging or advanced. Thus, the paper reviews the institutional underpinnings for macroprudential policies across countries, and explores ways to improve existing institutional setups, in a manner so as to provide basic guidance for the design of such arrangements. In line with previous work and in agreement with the Bank of International Settlements (BIS) and the Financial Stability Board (FSB),[6] macroprudential policies are defined here as *those polices that use primarily prudential tools to limit systemic or system-wide financial risks*.[7]

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[2] IMF (2011a), discussed by the IMF Board on April 4, 2011.

[3] A version of this paper was presented to the IMF Board at an informal session on September 12, 2011.

[4] See IMF (2011b) and references therein on risks assessments. See Borio and Shim (2007), CGFS (2010), Galati and Moessner (2010) and Lim et al (2011) on instruments.

[5] Recent papers include Ingves (2011), Nier (2009, 2011), Nier and Tressel (2011), and Viñals (2011).

[6] FSB, IMF, and BIS (2011), "Macroprudential Tools and Frameworks," Update to G-20 Finance Ministers and Central Bank Governors (February).

[7] The subject of what constitutes macroprudential policy is discussed further in IMF (2011a). Mitigation of systemic risk also requires use of tools outside of the prudential sphere, which need to be brought into the macroprudential framework.

While dedicated macroprudential policy frameworks have emerged only recently, some countries have for some time used prudential (and other) tools with a view to contain systemic risk.[8] This paper therefore starts by charting the existing landscape of financial stability arrangements around the world, with a view to assess the extent to which some of the main elements of a macroprudential policy framework identified in previous work (IMF 2011a)—institutions, mandate, powers, accountability—are already in place. Based on information contained in recent Financial Sector Assessments Programs (FSAPs) and 12 country case studies, it also describes recent trends and changes in these arrangements that are often aimed at providing greater institutional support for the use of macroprudential policy.[9]

The objective of this paper is to lay out some basic guidance for the review of institutional arrangement supporting macroprudential policies. For this purpose the paper identifies a distinct set of stylized institutional models, sets out criteria for assessing different models, examines their strengths and weaknesses, and explores ways to improve existing institutional setups. Much of this analysis is conceptual, since it is too early to assess empirically the effectiveness of models that have emerged only very recently. However, we also review some statistical analysis of basic relationships between institutional structures and outcomes.

The objective of this paper is not to identify a single "preferred" model. Institutional arrangements will inevitably be shaped by country-specific circumstances, such as the culture of cooperation, the perceived need for checks and balances as well as legal traditions. Rather, the paper identifies mechanisms that can address specific weaknesses of existing models or strengthen the effectiveness of macroprudential policy frameworks more broadly. It also distills lessons and identifies those features of models that are desirable for effective macroprudential policymaking. These desirables, summarized in Box 1, may form the basis for ensuring broad consistency in Fund advice, as countries are reviewing their existing frameworks.

[8] Indeed, mitigation of systemic risk has long been recognized as one of the (two) objectives of financial regulation and supervision, see Goodhart and Schoenmaker (1995), the other being protection of consumers when there is asymmetric information between the issues and buyers of financial claims. See also Nier (2011) for further discussion.

[9] The country case studies include Australia, Brazil, Canada, Hong Kong SAR, Iceland, Ireland, Korea, Mexico, Peru, Serbia, the United Kingdom, and the United States, and are available on request.

Box 1. Key Desirables for Macroprudential Policy Arrangements

General

1. The central bank should play an important role in macroprudential policymaking.
2. Complex and fragmented regulatory structures are unlikely to be conducive to successful mitigation of systemic risk and should therefore be avoided.
3. Participation of the treasury in the policy process is useful, but a leading role poses risks.
4. Systemic risk prevention and crisis management are different policy functions that should be supported by separate organizational arrangements.
5. Macroprudential policy frameworks should not become a vehicle to compromise the autonomy of other established policies.
6. Arrangements need to take account of country-specific circumstances.

Provide for effective identification, analysis, and monitoring of systemic risk

7. Mechanisms for effective sharing of all information needed to assess systemic risks should be in place.
8. At least one institution involved in assessing systemic risk should have access to all relevant data and information. It should be the one that disposes of the best existing expertise to assess systemic risk.
9. Mechanisms are needed to challenge dominant views of one institution.

Provide for timely and effective use of macroprudential policy tools

10. Institutional mechanisms should support willingness to act against the buildup of systemic risk and reduce the risk of delay in policy actions.
11. A lead macroprudential authority should be identified and be provided with a clear mandate and powers, in a manner that harnesses incentives of existing institutions to mitigate systemic risk.
12. The mandate needs to be matched by sufficient powers, including to initiate the use of prudential tools to address systemic risk. Mechanisms should be established to expand powers when needed.
13. The mandate should give primacy to the mitigation of systemic risk, but include secondary objectives to ensure that the policymaker takes into account costs and trade-offs.
14. To guard against overly restrictive or inadequate policy, proper accountability and transparency need to be put in place, without unduly compromising the effectiveness of macroprudential policy.

Provide for effective coordination across policies to address systemic risk

15. Institutional integration of financial regulatory functions within the central bank can support effective coordination of macroprudential policy with monetary as well as microprudential policy, but also requires safeguards.
16. Where institutional separation of policy decisions and control over policy tools cannot be avoided, the legal framework needs to assign formal powers to recommend or direct action of other policymakers.
17. Where there is distributed decision making among several agencies, establishing a coordinating committee is useful, but may not necessarily be sufficient to overcome collective action and accountability problems.

Effective institutional arrangements are a necessary, but not a sufficient condition for the effective prevention of crises. The recent experience shows that crises can be brought on by profligate fiscal policy and a lack of structural policies to stem an erosion of competiveness. As set out in IMF (2011a), an effective macroprudential policy framework will not be able to substitute for prudent policy in other policy areas. In addition, the exercise of macroprudential policy will remain challenging operationally even if the policy framework is fully effective. Macroprudential policy should not therefore be expected to prevent all future crises; and it needs to build on the foundations of strong microprudential policy as well as an effective resolution framework that helps ensure that no single institution is "too important to fail".[10]

The analysis and conclusions of the paper are part of the ongoing global debate on macroprudential policy. Internally, the paper aims to support the IMF's bilateral and multilateral surveillance, including advice provided as part of the FSAP, and the growing provision of technical assistance on establishing macroprudential frameworks. The paper has been written in cooperation with the IMF's area departments and has benefited from contributions from the Research Department.

The rest of the paper is organized as follows: Section II briefly charts existing and emerging institutional arrangements for macroprudential policy in advanced and emerging market countries. Section III singles out different stylized institutional models for macroprudential policies. Section IV identifies key criteria for the effectiveness of institutional models that are then used to analyze strengths and weaknesses of these models. Section V identifies mechanisms that can reduce weaknesses of specific models. Section VI distills lessons and provides basic guidance for the design of macroprudential institutional setups.

II. Existing Institutional Arrangements Across Countries: A Snapshot

This section reviews four elements of existing institutional arrangements for financial stability and macroprudential policies across countries: (i) institutional structures; (ii) mandate(s); (iii) independent powers of key policymakers; and (iv) accountability for financial stability, based on information from the 2010 IMF survey[11] and 12 country case studies—available from the authors upon request.

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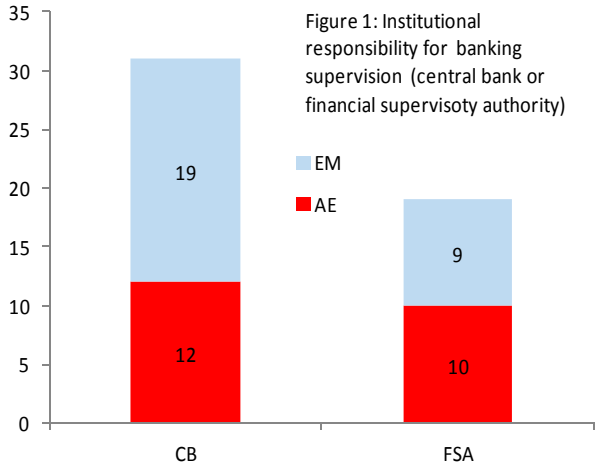
[10] See IMF (2011a) and Viñals (2010).

[11] The sample of countries that responded to the IMF survey includes Argentina, Australia, Austria, Belgium, Brazil, Bulgaria, Canada, Chile, China, Colombia, Czech Republic, Finland, France, Germany, Greece, Hong Kong SAR, Hungary, India, Indonesia, Ireland, Italy, Japan, Jordan, Lebanon, Malaysia, Mexico, Mongolia, Netherlands, New Zealand, Nigeria, Norway, Paraguay, Peru, Philippines, Poland, Portugal, Romania, Russian Federation, Serbia, Singapore, Slovakia, South Africa, Spain, Sweden, Switzerland, Thailand, Turkey, the United Kingdom, the United States, and Uruguay. The survey was also answered by the European Central Bank (ECB).

In over half of the surveyed countries the *institutional setup* is (partially) integrated so that the central bank serves as banking supervisor. For 31 out of the 50 countries responding to the IMF survey, the central bank is responsible for banking supervision. Among emerging markets, this setup is in place in two-thirds of the surveyed countries, while for advanced countries it is in just over one-half. In the other 19 countries, multiple agencies (including banking and securities regulators) have financial supervisory responsibilities, with institutional arrangements for financial sector supervision varying from integration (other than payment system oversight) outside the central bank to multiple agencies (see Table 1, Appendix I). In virtually all countries, the oversight of payment systems is conducted by the central bank.



Although the majority of countries have multi-agency set-ups, less than one-third have *committees* that play a coordinating role among the central bank and other regulatory authorities. These committees typically comprise the central bank and supervisory authorities, and often include a fiscal authority (e.g., minister of finance (MOF) or secretary of the treasury). While financial stability committees are more prevalent in countries where the banking supervisor is separate from the central bank, they also exist in countries where the monetary and banking supervisory authorities are closely integrated (e.g., the new model in Malaysia and the United Kingdom). There are also quite a few countries where a committee does not exist de jure despite there being multiple agencies with responsibility for financial sector oversight (e.g., Iceland, Korea, Peru, and Switzerland).

Where a financial stability committee exits, the executive branch (fiscal authority) has a leading role in half of these cases. In about half of the countries with a financial stability committee, the executive branch's fiscal authority (typically the MOF or the secretary of the treasury) chairs the committee. Having the executive branch chairing the financial stability committee is fairly common in the institutional arrangements recently established, in particular in emerging market countries (see Box 2). This setup may reflect the fact that such committees also tend to have crisis management responsibilities. Moreover, in many cases, these committees are based on an executive decree or a memorandum of understanding (MOU) among the members, rather than being established in statute. Since they are non-statutory, such committees often only have a coordinating function, that is, powers and decision making reside with the individual members.

Box 2. Institutional Arrangements for Macroprudential Policies in the Aftermath of the Crisis: Recent Trends

The financial crisis has led an increasing number of countries to introduce institutional changes to support macroprudential policies. These reforms follow two clear trends. In some cases, countries are moving towards more integrated institutional frameworks. In other countries, financial stability committees are becoming popular, often chaired by a representative of the executive branch or the central bank. To some degree, these trends follow some regional pattern associated with existing institutional arrangements.

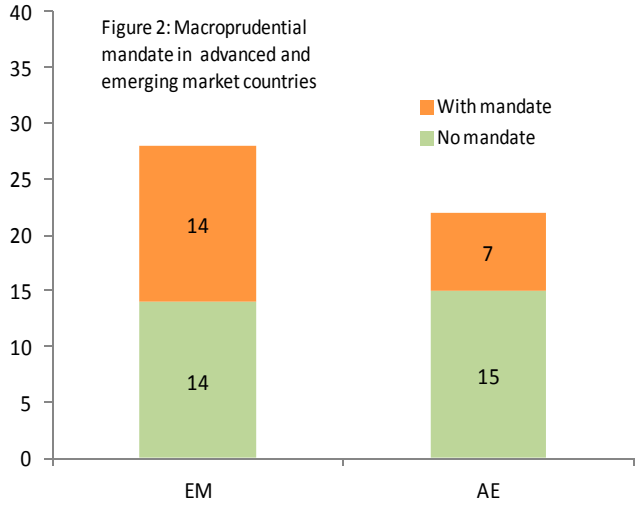
In the advanced economies, in particular in Europe, several countries are integrating prudential supervision into the central bank. Typically, these countries have adopted some form of "twin peaks" model, as in the Netherlands, leaving conduct-of-business supervision as a responsibility of a separate agency (Belgium, France, and the United Kingdom). Ireland has opted for stronger integration as all supervision is conducted by the central bank. The United Kingdom also created a financial policy committee (FPC) within the central bank, chaired by the governor and including government representation. The United States differs from the former arrangements *inter alia* because the government chairs the Financial Stability Oversight Council (FSOC), which functions separate from the Federal Reserve.

In emerging market countries, changes in the institutional setup typically feature a new committee with macroprudential policy responsibilities; however, no clear tendency in terms of who chairs can be established. In Chile and Mexico, recently established financial stability committees are chaired by the MOF, whereas in Turkey, the deputy prime minister is the head of this committee. Contrary to these, in Asia, Malaysia established a financial stability committee within the central bank structure, chaired by the central bank governor in 2009—as did Thailand in 2008.

The extent of the institutional reform for macroprudential policies, most typically in emerging markets, is constrained by the existing legislation. For instance, the central bank mandate and the consumer protection responsibilities of the supervisory authority, as well as their independence, may be enshrined in the Constitution (especially in Latin America). In this legal environment, changes to the macroprudential institutional setup are eventually modest and may even be suboptimal, like in Chile, where the governor of the central bank is not legally a member of the financial stability committee as the financial stability committee was established by a junior law that is seen as undermining the independence of the central bank enshrined in the Constitution.

Mandate /central bank & financial supervision	*Central bank or related committee*	*Committee headed by the government*
More integration	*Belgium, Ireland, the United Kingdom*	*France*
More separation	-	-
No change in integration	*Malaysia, Thailand*	*Chile, Mexico, Turkey, the United States*

A macroprudential *mandate* is more common in emerging markets and is most often assigned to the central bank, although it is often only implicit. In one half of the emerging markets in the sample, there is a macroprudential policy mandate (see Figure 2). This responsibility is assigned to central banks in 19 of the 21 countries. However, in most cases, it is not a formal mandate, but rests on the central bank's responsibility for ensuring the stability of the payment and settlement systems and its role as lender-of-last-resort, or the role of (other) institutions in financial sector supervision.[12]



To date, the decision to use macroprudential tools appears uncorrelated with whether an institution has an explicit macroprudential mandate. Fourteen countries that reported *not* having an institution(s) with a macroprudential mandate, nonetheless reported using instruments to address systemic risks during the last decade. On the other hand, 10 countries that reported having an institution(s) with a macroprudential mandate did not use any such instruments—perhaps because there was no need, or because they lacked the powers to use these tools. The vast majority of the countries that reported using macroprudential tools are emerging markets (see Appendix II). For these countries, the use of macroprudential instruments is often motivated by the experience of previous systemic banking crises that were preceded by "boom and bust" cycles in lending and leverage.

However, in many cases, the existing *powers* of many monetary and supervisory authorities may not be broad enough for them to fulfill a macroprudential mandate. In addition to many institutions lacking an explicit mandate, in many cases, fulfilling a macroprudential mandate may also be constrained by limitations on information gathering, overly prescriptive legal provisions that constrain prudential rule-making, and constraints on expanding the regulatory perimeter.

- *In most cases, supervisors' powers to access information are restricted to regulated institutions.* Supervisors have powers to obtain information from regulated institutions that typically includes access to information on a bank's exposures to large borrowers as well as transactions with related nonregulated companies in the

[12] In almost all countries, monetary and financial stability is ultimately the responsibility of the government. But governments often find that delegation of specific policy functions to agencies that are given mandates and powers to achieve the function can be the best way of delivering on this responsibility.

bank's financial group. There are a few central banks that have the power to collect information directly from firms to fulfill their monetary and/or credit policies tasks—for example, Brazil or Korea.[13] In addition, the newly created committees, such as the FSOC in the United States and the FPC in the United Kingdom, tend to have fairly extensive information gathering powers, or powers to obtain information from constituent agencies. Nonetheless, the G-20/FSB data gaps initiative is driving many countries to review where reforms may be needed.[14]

- *In some countries the microprudential supervisor may lack sufficiently broad and flexible powers to implement policies that can effectively contain the buildup of systemic risks.* Most countries, especially advanced countries, have sufficient regulatory powers to enforce Basel capital requirements and conform to Basel Core Principles (BCP).[15] However, where prudential rules are imbedded in the law (e.g., the minimum capital adequacy requirement set at 8 percent as per Basel, or loan-to-value (LTV) ratios) or set by a minister, the supervisor often cannot adjust requirements (such as sectoral risk weights or LTV ratios) in response to the buildup of systemic risk.[16] This is fairly common in Latin America and Europe where example includes Finland, France, and the Netherlands.[17]

- *Financial stability committees do not typically have the power to "direct" individual regulatory authorities to address systemic risks.* Only very few countries have statutory financial stability committees (i.e., formally established by law), which may have formal powers to recommend or direct macroprudential policies (e.g., the U.K. FPC, the U.S. FSOC, and Mexico's FSC).[18] Indeed, as noted earlier, most committees coordinate policy through information sharing and discussions, but policy decision and implementation is ultimately up to the individual agencies.

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[13] Even when the central bank also has some statistics collection functions, there may be legal firewalls so that the data collected for statistical purposes may not be passed on in any form that would permit the identification of individual firms.

[14] See for example the recent legal amendment in Hong Kong SAR to enable the securities regulator access to information on short positions.

[15] The median BCP ratings for core principle 1, sub-principe1.3 on legal framework, which includes the power to set prudential rules indicates that most supervisors are compliant or largely compliant, although these ratings are often lower in emerging economies.

[16] Crowe et al (2011) provide discussion of LTV ratios as a tool to contain housing booms.

[17] As noted by the Netherlands FSAP, see IMF (2011d), and Nier and Tressel (2011). The latter paper provides some further discussion in the context of European Union (EU) proposals for a new capital requirements directive (CRD IV).

[18] There is also Brazil's National Monetary Council, which issues prudential regulations.

- *Expanding the perimeter of regulated institutions requires legislation and hence, the involvement of the government.* Most supervisory authorities have the power to issue regulations on both prudential and reporting requirements, but these powers are limited to the already regulated entities. Imposing regulation on other nonregulated entities (both financial and nonfinancial) or transactions would typically require a prior change in the law.

In most countries, *accountability* mechanisms exist for central banks and supervisory institutions, but formal accountability requirements for macroprudential policies *per se* are rare. In some cases, such accountability mechanisms are being developed or have recently been introduced, e.g., in Ireland, Mexico, the United Kingdom, and the United States. These often involve accountability to the public and Parliament. For example, in the United Kingdom, the FPC is required to publish a financial stability report (FSR), and a record of the decisions and deliberations of FPC meetings. In the United States, legislation requires publication of an annual report and testimony to Congress.

Most countries nonetheless, communicate on systemic risk assessments and policies mainly through issuing an FSR. Among the 12 country case studies, 9 countries issue FSRs. While these contain assessments of risks (and often stress test results), risk warnings are only publicized in two cases (and only in one country are these warnings published on a regular basis). Several countries, however, report that they are developing their communication framework for macroprudential policies.

III. Institutional Models for Macroprudential Policy

This section proposes a typology of existing and emerging models for macroprudential policy. Real-life institutional models differ in a vast number of ways. In order to assess the strengths and weaknesses of existing arrangements, we therefore have to develop a stylized typology of models that stresses a number of key dimensions along which models can differ.

We identify five key distinguishing dimensions of real life models: (i) the degree of institutional integration between central bank and financial regulatory and supervisory functions; (ii) the ownership of the macroprudential mandate; (iii) the role of the government (treasury) in macroprudential policy; (iv) the degree to which there is organizational separation of decision making and control over instruments; and (v) whether or not there is a coordinating committee that, while not itself charged with the macroprudential mandate, helps coordinate several bodies.

These dimensions allow us to capture the vast majority of models that are in place or are being developed across countries (Table 1). The number of dimensions chosen here is somewhat larger than that employed by other typologies to date,[19] and leads to *seven models*,

[19] CGFS (2010).

in addition to a supranational model (the European Systemic Risk Board, ESRB). It turns out that the dimensions are not all entirely independent from each other in practice, reducing the number of observed models relative to the much larger number of theoretically possible ones. A short description of the dimensions is as follows.

- *Degree of institutional integration of central bank and financial regulatory functions.* Institutional integration affects the extent to which coordination of central bank and financial regulatory functions occur "under one roof" or across agencies. It also affects how much information is available within the central bank. Importantly, the degree of institutional integration tends to condition the type of macroprudential policy model we observe in practice and can, for example, affect the assignment of the mandate for macroprudential policy. The degree of integration can be *full*, *partial*, or *nonexistent*. Full integration means that all financial supervisory and regulatory functions are carried out by the central bank or by its subsidiaries. Partial integration means that the securities supervisor or business conduct supervisor are separate entities, while prudential supervision of banks (and other institutions) is conducted by the central bank.

- *Ownership of macroprudential policy.* Ownership indicates which institution (or set of institutions) should be held accountable for limiting systemic risk. Ownership of the macroprudential mandate can rest with the (board of the) central bank or a committee *related* to the central bank. Alternatively, it can rest with an *independent* committee or be *shared* by multiple agencies. A committee related to the central bank differs from an independent committee in that the former is legally part of the central bank and chaired by its governor. If the mandate is given to multiple agencies, each agency is expected to take responsibility for mitigation of systemic risk arising in its domain.

- *Role of the treasury.* The benefits and costs of treasury involvement have been discussed in detail in IMF (2011a). The formal role of the treasury can be (i) *active*, if it plays a leading role in policymaking or coordinating committees; (ii) *passive*, if the treasury participates in such committees, but has no special role; or (iii) simply *nonexistent*. Where there is no committee, the treasury may sometimes have direct powers of direction, which also translates into an active role. By establishing whether or not the treasury has a formal role, our characteristic only approximates the impact of the government, since it does not capture indirect government influences affecting the policymaking process.

Table 1. Stylized Models for Macroprudential Policy

Features of the model/Model	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**	**Model R 1**
1. Degree of institutional integration of central bank and supervisory agencies	Full (at a central bank)	Partial	Partial	Partial	No	No (Partial*)	No	No
2. Ownership of macroprudential policy mandate	Central bank	Committee "related" to central bank	Independent committee	Central bank	Multiple agencies	Multiple agencies	Multiple agencies	Committee (multinational; regional)
3. Role of MOF/ treasury/government.	No (Active*)	Passive	Active	No	Passive	Active	No (Active*)	Passive (European Commission; Economic and Financial Committee)
4. Separation of policy decisions and control over instruments	No	In some areas	Yes	In some areas	No	No	No	Yes
5. Existence of separate body coordinating across policies	No	No	No (Yes*)	No	Yes	Yes (de facto**)	No	No
Examples of specific model countries/ regions	Czech Republic Ireland (new) Singapore*	Malaysia Romania Thailand United Kingdom (new)	Brazil* France (new) United States (new)	Belgium (new) The Netherlands Serbia	Australia	Canada Chile Hong Kong SAR* Korea** Lebanon Mexico	Iceland Peru Switzerland	EU (ESRB)

- *Institutional separation of policy decisions from control over policy instruments.* This arises when policy decision and policy implementation rest with different bodies or institutions. Separation of policy decisions and control over instruments is common when the mandate is given to a committee, or when there is only partial integration of supervisory functions within the central bank. There is no such separation when there is full integration of all financial policy within the central bank or, at the other extreme, when multiple agencies *each* take their own decisions to address systemic risks in their respective policy domains.

- *Existence of a separate body coordinating across policies to address systemic risk.* A coordinating committee can promote a common understanding of risks and contribute to consistency of policy responses across agencies. A separate coordinating committee is a feature of some of those models where the policy mandate is shared by multiple agencies. By definition, it is not needed when the mandate and the associated decision making powers are assigned to a single body or a policymaking committee. The difference between a policymaking committee and a coordinating committee is important and rests on a number of features, such as whether the committee (i) is established in law; (ii) has a right to make formal decisions or recommendations to affect the behavior of other policymakers; and (iii) has a formally established accountability framework, that is distinct from that of its member institutions. Unlike a policymaking committee, a coordinating committee is typically based on an MOU, does not take formal decisions to influence its participants and does not have a separate accountability framework.

Based on these dimensions we can identify seven stylized institutional models of macroprudential policymaking. Most real-life institutional set ups correspond to one of these seven models, even though some real-life models are hybrids or differ from the assigned model in some respects (marked in Table 1). In addition, stylized models cannot capture "soft" features of real-life arrangements, such as the culture of cooperation and the quality of relationships between people. The seven stylized models are discussed in detail in the following section. Table 1 also includes an eighth model describing the ESRB, which is the only existing example of a supranational institutional setup. The effectiveness of the ESRB is assessed in more depth in the recent European Financial Stability Framework Exercise report (IMF 2011c), and its relationship with national arrangements in a Selected Issues Paper prepared in the context of the 2011 euro area consultation (Nier and Tressel, 2011). These papers also offer a discussion of the cross-border aspects and regional coordination of macroprudential policy, which is outside the scope of this paper.[20]

The seven models can be grouped into three broad classes of models. In the first model, there is full integration between the central bank and all financial supervisory and regulatory

[20] Nier and Tressel (2011) also offer a precursor of the seven national models proposed in this paper, as well as a brief discussion of their strengths and weaknesses, in the context of the overall arrangements in the EU.

functions. In a separate group of models (models 2, 3, and 4), the underlying institutional model is twin peaks, with the central bank retaining prudential functions, while conduct and securities regulation is separate. In a third group (models 5, 6, and 7), the central bank is separate from both prudential and securities market regulation. Models within these groups tend to share certain similarities, but there are also important differences between models within each group (see Table 1).

IV. Assessment of Models

Our assessment of the prevailing and emerging institutional models for macroprudential policy proceeds in three steps. In this section we first present a number of high-level requirements for an effective institutional model supporting macroprudential policy. We then assess the strengths and weaknesses of the models identified in Section III against these criteria, highlighting similarities and differences between models in this regard. We finally discuss mechanisms to address weaknesses in Section V below. Throughout, while much of the analysis is conceptual, we draw on our case studies for insights and examples.

A. Criteria for the Assessment of Strengths and Weaknesses

At the highest level, a desirable institutional model should be *conducive to effective mitigation of systemic risk*. This requirement can be broken down into the following criteria that are important to ensure successful delivery of macroprudential policy.[21] A model should provide for:

- Effective identification, analysis and monitoring of systemic risk, including through (a) assuring access to relevant information; and (b) using existing resources and expertise.

- Timely and effective use of macroprudential policy tools, by (a) creating strong mandate and powers; (b) enhancing ability and willingness to act; and (c) assuring appropriate accountability.

- Effective coordination across policies aiming to address systemic risk, so as to reduce gaps and overlaps in risk identification and mitigation, while preserving the autonomy of separate policy functions.

B. Strengths and Weaknesses: Model 1

Model 1 involves the full integration within the central bank of essentially all financial regulatory and supervisory functions, including the prudential regulation of financial institutions and the regulation of market activity, in both retail and wholesale financial markets. When, as in the new model introduced in Ireland, the central bank is given the

[21] These draw on IMF (2011a).

objective to safeguard financial stability, the central bank becomes the owner of macroprudential policy and its Board becomes the macroprudential decision maker. This model has a number of strengths across the three criteria set out above (risk identification, mandate and incentives, and coordination). We start by summarizing these strengths, before turning to potential weaknesses across the same three dimensions.

As regards risk identification and monitoring, full institutional integration can facilitate the flow of information and bring together relevant expertise, in ways that might otherwise be subject to legal constraints or strategic behavior among agencies.[22] Under full integration the management can assure that incentives are in place for cooperation in risk assessment and proactive delivery of relevant information to the decision maker (the Board) even if confidentiality issues can impede the free flow of data even inside one organization to some extent.

- The model facilitates access to the available quantitative as well as qualitative microprudential data, including sectoral and interbank exposures that are needed to assess systemic risks.

- The model also facilitates access to data that may be available to a securities regulator (e.g., on positions taken in markets).

- The analysis of risks can bring together microprudential expertise and risk assessments with assessments of macro-financial linkages by central bank staff, thereby enriching the analysis and fully exploiting complementarities between top-down and bottom-up risk analysis, e.g., in the approach to stress tests.

Full integration within the central bank also helps assure that use is made of existing analytical expertise. Due to their existing roles in monetary policy and payment systems, central banks have expertise in the analysis of systemic risks that is crucial to inform macroprudential policies. Their research function may help identify and understand evolving systemic risk related to financial innovation. Central banks' expertise in monitoring financial markets and analyzing aggregate and sectoral developments can be brought to bear in the design of policies 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 (IMF 2011a).

The model also enables use of the central bank's existing experience in communicating risks to the markets and general public. Due to their monetary policy and financial stability functions, central banks have experience in communicating risks to the markets and general

[22] Inter-agency rivalry can lead one agency to be reluctant to share information since it wants to hold on to its "power." Within an organization, such rivalry is between departments and can be addressed by management, through incentives and mechanisms to foster cooperation. However, confidentiality rules may hinder the free flow of information even in the case of an integrated structure.

public. Full integration also means that risk warnings and messages are likely to be coherent. The central bank management can ensure that that all officials speak with "one voice."

The model has a number of strengths also as regards incentives to use macroprudential tools. First, mandate and responsibility are clearly assigned to a single agency which can be held accountable for achieving its objectives. This reduces incentive and accountability problems that arise when responsibility is shared among several agencies (that are discussed in more detail in the context of alternative models, further below). Second, responsibility is assigned to an institution, the central bank, that has clear incentives to act due to high costs of inertia for meeting its other goals, e.g., price stability (Nier, 2009; and IMF 2011a). The central bank's role as lender of last resort further strengthens these incentives.[23] Third, central bank independence and a limited role of the treasury reduce the risk of delayed action due to the political cycle and short-term effects on government revenues (IMF 2011a).

The model has clear strengths also in fostering coordination across policy functions. [24] First, coordination across objectives and functions (macroprudential, monetary, and microprudential) takes place within one organization rather than across organizations. This can increase effectiveness of decision making when there is a need to internalize trade-offs (e.g., price stability versus financial stability, systemic risk mitigation versus consumer protection). Second, full integration can reduce mismatches between the reach of mandates and the reach of powers, because the decision maker has control over most of the relevant tools, including those available to a microprudential and a securities regulator. Third, policy decisions made by the Board of the central bank can be implemented by a department of the same organization and do not come to compromise the operational autonomy of a separate organization. As explained in more detail further below, coordination is more difficult to achieve in models where influence to effect policy changes on the part of the macroprudential decision maker conflicts with the operational autonomy of separate regulators, such as a separate microprudential supervisor or a separate securities regulator.

As regards risk identification, a drawback of the full integration model is that it lacks institutional mechanisms to challenge the views (risk assessment) formed within the one institution. In particular, there is a risk that "house views" become entrenched if there is no culture within the organization of encouraging and debating contrarian views. A second

[23] Goodhart and Schoenmaker (1995), and Nier (2009). These incentives can lead the central bank to demand high capital and liquidity buffers. Standalone supervisory agencies can also have strong incentives, especially when their mandates emphasize stability objectives.

[24] These benefits pertain to the mitigation of risks both in the time dimension and in the structural dimension. The model facilitates coordination between macroprudential and microprudential policy in the mitigation of aggregate (cyclical) risks. It also facilitates coordination in the mitigation of risks to the financial system that can arise from the failure of individual components. In particular, both the prudential control of systemically important institutions and the oversight of systemically important infrastructure can occur without the need for interagency coordination between separate macro and microprudential regulators (for institutions) or between the central bank and a separate securities regulator (for infrastructure).

potential weakness is that full integration creates a large and multi-functional organization that will, in general, be more difficult to manage than a narrowly focused organization. More specifically, bringing data and expertise together across departments of a large organization can be challenging.

Full integration harnesses central bank incentives, but concentrates a lot of powers in the hand of unelected central bank officials.[25] While the model is likely to enhance willingness and ability to act, it provides for few safeguards against overly aggressive use of macroprudential (and other) policy tools. In principle, macroprudential policy is a policy field where delegation of power is desirable (Ingves, 2011): (i) it is subject to adverse political economy problems; (ii) it requires a high level of technical expertise; and (iii) it is subject to strong lobbying and rent seeking. Since macroprudential decisions will most directly affect the financial sector, rather than the economy as a whole, lobbying to preserve financial sector profits is a much stronger concern for macroprudential policy than it is for monetary policy.[26] Nonetheless, societies may still be reluctant to concentrate both monetary policy and all financial regulatory policies in the hands of a single independent decision maker. If they do, powers need to be subject to a precise mandate and strong accountability mechanisms, as discussed further below.

Full integration can increase reputational risks across monetary and prudential functions. Integration under one roof can improve coordination across monetary and macroprudential policy functions. However, this can reduce credibility for the former when the public doubts the central bank's focus on price stability in setting interest rates (Box 3). Failures in microprudential supervision can also affect the credibility of the monetary policymaker and may undermine the independence of the monetary policy function (Goodhart and Schoenmaker, 1995; and Nier, 2009). This is a greater danger in the absence of clearly separate accountability frameworks for monetary and prudential action.

Full integration of the conduct and markets regulator can also come with costs. While integration of the markets and activities regulators ensures access to relevant data and control over policy instruments in these domains, integration of these policy functions within the central bank also means that the central bank inherits consumer and investor protection objectives and conduct of business functions which can distract attention from systemic risk objectives, especially in long periods of calm.

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[25] This is in particular when the central bank also conducts monetary policy in an independent manner. Historically this has led some governments to separate monetary and prudential policies, as monetary independence was strengthened.

[26] Igan and others (2009) analyze lobbying activity of mortgage lenders ahead of the crisis and provide suggestive evidence that the political influence of the financial industry had an influence on financial stability. Kroszner and Strahan (1999) show that special interests theory can explain the design and timing of bank deregulation in the United States.

Box 3. Monetary and Macroprudential Policies: One Authority or Two?[1/]

Is it better to centralize monetary and macroprudential policies under one roof or should these policies be kept separate? Several factors need to be considered. First, as in other policy contexts, there exists a trade-off between policy coordination and credibility. Second, there is the issue of information sharing (in the United Kingdom, the Northern Rock debacle highlighted the problems associated with agency coordination). Third, since expertise is path-dependent there is the issue of how to best exploit the experience and talent already accumulated in existing agencies. This is especially critical in small countries in which there may be a shortage of human resources. This Box focuses primarily on the game-theoretical problems associated with the first issue.

Consider the first case: separate agencies with different mandates. This may involve a central bank in charge of monetary policy and tasked with price and output stability. The central bank is obviously not indifferent to systemic risk and financial stability, but puts greater weight and priority on its traditional mandate: low inflation and output gap. This case also involves a financial authority in charge of macroprudential policy and tasked with macrofinancial stability. It does care about inflation and growth, but only to the extent that they affect the stability of balance sheets. It focuses on issues, like credit growth, leverage, and debt overhang, which more directly affect financial stability.

The issue is that each instrument affects both objectives. Interest rates will affect behavior in financial markets and macroprudential policy will, through its effects on the cost of credit, affect aggregate demand. This means that policy action by one regulator entails an externality for the objectives of the other. Absent other issues, the obvious solution to solve an externality is consolidation: put everything under one roof. A centralized authority will always be able replicate what independent regulators would do. However, separate agencies playing Nash may not end up coordinating on the first-best centralized solution.

The example of the relationship between fiscal and monetary authorities may be useful. Relative to the coordinated solution, the treasury will push for greater output (a larger deficit) anticipating that the central bank will increase interest rates in reaction. The central bank will keep interest rates higher as it will assume that the treasury will run a larger deficit. The result will be an equilibrium where the deficit and the policy rate are both higher than optimal (implying more crowding out).

One can imagine a similar game between the central bank and the macroprudential regulator. For example, in a recession, the central bank may cut the policy rate aggressively to stimulate demand. Worried about the effects of a relaxed monetary stance on risk taking, the financial authority reacts by tightening macroprudential regulation. Anticipating this response and its contractionary effect on demand, the central banks cuts rates even more aggressively. And so on. The outcome is a policy mix with too low interest rates and too tight macroprudential measures relative to what a coordinated solution would deliver.

The problem is that there is a second complication: Policy effectiveness (especially on the monetary policy front) depends critically on the credibility of institutions. And this will be inevitably undermined when an institution is tasked with potentially conflicting objectives.

Again, the example of fiscal and monetary policy is useful. It was concluded long ago that central bank independence from the treasury is critical to preserve price stability. Absent independence, the credibility of the central bank will be challenged by concerns about its willingness to act against inflation, as it may be too concerned about output and the effects of an increase in interest rates on public deficits (see Barro and Gordon, 1983).

A similar argument can be made for separation between monetary and macroprudential policymaking. Take the case of an economy with rising inflation, but too little risk taking that has resulted in stagnant credit (for example, after some shock has raised risk aversion). A joint regulatory authority will have a harder time convincing the public that it will fight inflation (and thus, anchor expectations), when this conflicts with the other objective (Goodhart and Schoenmaker 1995). This in turn, will worsen the sacrifice ratio (as for the

fiscal/monetary policy case). Then, a Nash game between two separate independent regulators may dominate the coordinated solution.

The optimal structure may depend on the relative weight of these concerns and needs to figure in the remaining aspects that were mentioned at the outset. When the policymakers are closely aligned institutionally, as under the new arrangements in the United Kingdom and the EU (ECB, ESRB), separate accountability arrangements for monetary and macroprudential policy may help address credibility concerns (see IMF 2010 and IMF 2011a).

1/ This box was prepared by Giovanni Dell'Ariccia.

Finally, the lack of involvement of the treasury can entail costs, when addressing systemic risk requires coordinated action by the government. Willingness to cooperate may diminish when treasuries are fully excluded from discussions on the buildup of systemic risk and the required policy action. This can be a limitation in particular when there is a need for legislation, e.g., to introduce new macroprudential powers or to expand the perimeter of regulation, or otherwise when fiscal and other policy measures are needed to complement prudential tools.

C. Strengths and Weaknesses: Models 2–4

For the group of models comprising models 2, 3, and 4, the underlying model of financial regulation is (a version) of *twin peaks.* This setup, originally pioneered by the Netherlands (introduced there in 2002), involves close institutional integration between the central bank and the prudential supervisor and regulator of potentially systemic financial institutions, such as banks, while the regulation of activities or "conduct" in wholesale and retail financial markets is institutionally separate from the central bank.

- In the new model proposed for the United Kingdom, the new prudential agency is organized as a subsidiary of the Bank of England, while a new *Financial Conduct Authority (FCA)* will regulate the conduct of every authorized financial firm providing services to retail consumers and in wholesale markets, as well as regulated exchanges.

- In the United States, the Federal Reserve has become the supervisor of any systemically important holding company (bank or nonbank) and has been given powers to subject these firms to enhanced prudential standards,[27] with FSOC playing the role of designating such firms.[28] The regulation of activities in retail and

[27] Financial subsidiaries of these holding companies, such as banks, insurance companies and brokers continue to be supervised by specialized agencies, unless they are state-chartered members of the Federal Reserve System.

[28] This can be a useful device in countries where the number of banks is large (Nier, 2009). Designation can then focus the central bank's *supervisory* attention on those institutions that are individually systemically relevant. In addition the central bank may be given *regulatory* control over a larger set of institutions that are collectively important in a manner that allows the central bank to calibrate countercyclical measures, such as a dynamic capital buffer.

wholesale financial markets continues to be conducted by a number of specialized agencies, including the new Consumer Board and the existing Securities and Exchange Commission (SEC).

- The new model introduced in Belgium, likewise establishes twin peaks, in a manner closely following the existing model in the Netherlands, and moving the structure away from separation between the National Bank of Belgium and the independent financial regulator.

Models in this group therefore retain a strong role of the central bank in systemic risk mitigation. However, they differ in a number of other respects that affects the assessment of the relative strengths and weakness relative to the fully integrated setup (model 1).

Model 2

In this model a dedicated committee is established at the central bank with responsibility to mitigate systemic risks for the system as a whole. For example, in the United Kingdom, the new FPC will be chaired by the governor, and assemble a number of other central bank officials as well as the head of the prudential authority (inside the central bank) and the head of the FCA (outside the central bank). It will come to sit alongside the existing Monetary Policy Committee (MPC).

This model is quite similar in a number of respects to model 1 and hence, inherits a number of its key strengths and potential weaknesses. The central bank retains strong access to relevant prudential data and expertise, helping risk identification. The model also clearly assigns responsibility for risk mitigation to a single body, which in this case is the central bank's macroprudential committee. Since this is a committee of the central bank as an organization, the beneficial incentive effects of assigning the mandate to the central bank are likely to come through in the behavior of the committee. On the other hand, since decision making is concentrated in the hands of a single body, rather than dispersed, there is a considerable concentration of power, again requiring compensating mechanisms, such as an unambiguous mandate and strong accountability arrangements, as further discussed below.

There are also a number of differences that affect the assessment of strengths and weaknesses of this model in subtle ways, relative to full integration and decision making by the Board of the central bank (as in model 1). These mainly relate to the differences in the way coordination is achieved across policy fields.

Assigning the macroprudential policy mandate to a dedicated committee that has no role in monetary policy can help limit reputational risks. Highly visible failure to deliver effective macroprudential policies is more easily contained to those delivering the macroprudential function and less likely to contaminate the reputation and independence of the monetary decision maker, especially when the composition of the two committees differs and the accountability arrangements supporting different policy functions are clearly visible to outsiders (IMF, 2010).

A dedicated committee can also allow for treasury participation. Since decision making is in the hands of a dedicated committee, rather than the Board of the central bank, the treasury is able to participate (as an observer or even as a voting member), without this undermining the independence of the monetary policy function or of the central bank as an organization. As argued above, this can have benefits when cooperation by the treasury is needed to ensure mitigation of systemic risk, e.g., when effective mitigation of risks requires legislative change.

But the creation of a dedicated macroprudential committee can also come at the cost of reduced coordination with monetary policy, potentially leading to a suboptimal policy mix relative to model 1 (Box 3). The importance of this issue may be diminished when there is sufficient overlap in the membership of the committees and since the natural frequency of macroprudential action is lower than that for monetary policy (Tucker, 2011). In this case, as with fiscal policy, the monetary policymaker becomes the "second-mover," taking account of actions taken by the macroprudential committee.

Establishing the financial conduct and securities markets authority outside the central bank also affects strengths and weaknesses. On the positive side, the central bank's top management or the dedicated macroprudential committee are unlikely to become distracted by the day-to-day business of a conduct and securities regulator.

- A potential downside is inadequate engagement and support of the conduct and securities regulators in systemic risk identification. Representation of the agency on the macroprudential committee is a useful mitigating mechanism, as is emphasizing financial stability in the mandate of the separate securities and conduct regulators (as in the United Kingdom). The law can in addition specify a duty to provide information.

- Another downside is that the committee has no immediate control over tools of the securities and conduct regulators when these may be needed to mitigate systemic risks. To bridge the separation between decision making on the part of the committee and control over instruments, a number of mechanisms are being envisaged, as further explored in the next section.[29]

Model 3

Under this model, while the central bank participates in the policymaking committee, the latter is independent from the central bank and chaired instead by the treasury. First, overall responsibility for financial stability shifts away from the central bank and towards the

[29] Mitigation of systemic risks in the context of the clearing and settlements of financial transactions is particularly important, especially in more market-based financial systems. In the new model in the United Kingdom, oversight over clearing and settlement systems has been assigned to the Bank of England, expanding its existing role in payments system oversight.

committee. Second, the treasury plays a stronger role on the committee and hence as a macroprudential decision maker. The implications for the balance of strengths and weaknesses are as follows.

When multiple agencies, including the central bank and the treasury, are involved in risk assessment, this may create a situation where no one institution may have all information needed to analyze all interlinked aspects of systemic risk, creating inefficiencies in risk assessment.[30]

A more balanced committee structure can also lead to delay in taking action. It may create a greater risk that differences of view will persist and remain unresolved, leading to delay in taking action. A greater balance will, on the other hand, mitigate the risk that the views and assessments of one institution will become entrenched and remain unchallenged.

A more balanced committee structure can result in difficulties in establishing clear accountability. With a number of key players involved in macroprudential policy (central bank, committee and treasury), there may be a greater risk that the public will not understand who is ultimately responsible for preventing crises. Involvement of multiple agents in macroprudential policy can also create greater challenges in communication.

As regards coordination, an independent committee will tend to create greater separation between policy decision and control over tools, relative to model 2, since this now also applies to tools in the gift of the central bank. This requires greater reliance on mechanisms to compensate for separation between decision and control over tools (as discussed further below).

A strong role of the treasury can also affect strengths and weaknesses. A potential advantage of a stronger role of the treasury relative to the central bank is that the treasury can help garner political support for the actions of the committee. However, in view of the political economy challenges associated with macroprudential action, a stronger role of the treasury increases the risk that short-term political considerations prevail over the central bank's incentives to mitigate systemic risk. This can cause delay when the committee needs to take countercyclical action to prevent the buildup of systemic risk in good times, but such action hurts industry profits and reduces tax revenues.

A strong role of the treasury also poses a risk that the operational autonomy of related policy fields is undermined. If the treasury has a strong role on the macroprudential committee, this can weaken the established operational autonomy of the micro-supervisory authority. [31] A

[30] In the United States, this is mitigated since all agencies will have access to data collected by the new Office of Financial Research (OFR).

[31] In principle, this is a lesser concern for models 1 and 2, since in these models the central bank governor chairs a committee whose decisions will often be implemented by the central bank supervision department, rather than by a separate agency.

strong role of the treasury may also undermine the central bank's operational independence in setting monetary policy. The latter is a greater risk where the independent committee is meant to coordinate across all policy fields, including monetary policy, and in (some emerging market) countries where existing safeguards to protect monetary policy independence are weak.

Model 4

This model is identical to model 1 in almost all respects, other than that the authority overseeing activity in wholesale and retail financial markets is separate from the central bank. Unlike in model 2 or 3, however, there is no formal "bridge" between the central bank and the activities regulator, such as representation of both agencies on a macroprudential committee, which would enable the macroprudential decision maker greater access to information and tools in the gift of the latter.

A bridge between central bank and the conduct and securities regulator may be less important where financial markets are less developed and sophisticated, reducing the need for access to data on activity in wholesale financial markets and to track the behavior of key market participants (e.g., hedge funds and other investment funds). But even here, the authority may need information and influence on practices in retail markets, such as the terms of mortgage contracts, which may require cooperation of and coordination with the conduct regulator. It may also need information on the activities of nonbank lenders (shadow banks) that may be under the purview of the separate securities regulator. As for model 2, the mandate of the separate securities and conduct regulator(s) can usefully emphasize financial stability alongside consumer protection and market access (and does so in the case of the Netherlands). But ensuring the necessary degree of cooperation may require additional mechanisms, as further discussed below.

D. Strengths and Weaknesses: Models 5–7

Relative to the previous models, this group of models is characterized by a much greater degree of institutional *separation* between the central bank and supervisory agencies. As in the group of models discussed just above (models 2, 3, and 4), securities regulators are housed outside the central bank. In addition, the prudential supervision and regulation of financial institutions is also institutionally separate from the central bank.[32] In almost all cases, the central bank retains oversight of payment systems as well as control over reserve requirements, but it has no direct control over the use of other macroprudential tools, such as

[32] In some countries, conduct of business and securities market regulation are institutionally integrated with the prudential supervision of financial institutions, forming FSA-type agencies. In some countries, prudential and conduct supervision of institutions are integrated, while there is separation along sectoral lines (banking, insurance securities). Finally, conduct and securities supervision can be separate from the prudential regulator, e.g., Australia.

LTV ratios and variation in capital and liquidity requirements, with control over the use of such tools vested in a separate and operationally autonomous prudential regulator.

This group of models also share the feature that identification and mitigation of systemic risk is a *multi-agency* effort, with the central bank often leading risk identification in practice. Equally, use of macroprudential policy tools is a multi-agency effort: each individual agency decides on and remains ultimately responsible for the use of those tools that are under its purview. There is "distributed decision making" rather than decision making by a central body or committee (Ingves, 2011).

A potential strength of these models is that they tend to keep each agency focused on their main objective. The central bank is focused on price stability, while the separate banking supervisor is focused on the safety and soundness of individual institutions, which in and of itself can contribute to financial stability. [33] Separation of functions also reduces overlaps, creates strong institutional cultures in each policy field and facilitates the creation of separate accountability for monetary and prudential policy. Moreover, there is little risk that any one institution may become dominant and remains unchallenged in its identification of risks or assessment of the appropriate policy response. However, these models also share a number of potential weaknesses that may reduce effectiveness of macroprudential policy, which are set out below. In addition, Box 4 reviews some evidence that strong separation between central bank and supervisory agencies may not be conducive to effective mitigation of systemic risk.

Strong institutional separation between central bank and microprudential supervisor may impede the flow of microprudential data and risk assessments that may otherwise enrich the analysis of network risks and macro-financial linkages conducted by the central bank. In some countries, rivalry and turf issues impede the free flow of information. In others, there are legal obstacles to the sharing of sensitive information outside of the institution collecting the information.

A focus of each institution on its particular objectives also reduces the chance of successfully bringing together relevant expertise. It is more difficult to combine the macroeconomic and markets expertise of the central bank and the institution-specific knowledge available within the prudential regulator, since such collaboration will require scarce resources being dedicated to common, rather than to institution-specific goals. A case in point is Ireland, where collaboration between the central bank and the prudential regulator in drafting the FSR was stopped in 2005, when staff of the prudential agency was re-assigned to different tasks (Honohan, 2010).

A strong focus of each institution on their specific objectives and functions may also increase the risk of "gap"—risks remaining undetected or unaddressed. In particular, in countries where the prudential supervision of financial institutions is distributed among several

[33] Bordo and others (2011) examine the experience of Canada.

agencies, there is a greater risk that individual firms or groups of firms grow in systemic importance without this being reflected in a tightening of the supervisory regime. The main example here is the previous model in the United States, where securities brokers and money market mutual funds were subject to a light-touch regime of supervision and regulation by the SEC, even as they became critically important to the functioning of the United States financial system as a whole.[34]

Where multiple agencies are responsible for mitigating systemic risk coordination problems can arise in communication. Each agency may develop their own communication strategy, emphasizing risk assessments arrived at in-house, potentially leading to conflicting messages in communication across agencies.

When multiple agencies are collectively responsible for mitigation of systemic risk this can dilute accountability and incentives. A "commons" problem can arise in macroprudential policy if multiple agencies are responsible for mitigating systemic risk. Even though each institution may have a mandate to use resources and tools in its purview to ensure mitigation of systemic risk, no one agency is fully responsible for the (crisis) outcome when the overall effort to mitigate systemic risk has been insufficient. In principle, separate agencies can cooperate to achieve the desired policy outcome; however, neither agency is fully responsible if such cooperation fails. This reduces the incentives on the part of all agencies to invest in systemic risk reduction through macroprudential policies (Nier, 2009).

Collective responsibility can also lead to delay in taking action. When multiple agencies that each have a mandate to mitigate systemic risk they may not agree in their assessment of the level and source of systemic risk, for example, because their perspectives on risks or their methods of analysis differ. Such disagreements can lead to delay in taking the appropriate action. A case in point is the U.K. experience under the previous model, where despite concerns on the part of the Bank of England over the buildup of liquidity risks the existing prudential liquidity regime was tightened only after the crisis had struck.[35]

A multi-agency setup can also result in a suboptimal policy mix. While the central bank has institutional incentives to ensure financial stability, it may have limited powers at its own disposal to achieve the objective. This can lead to situations where the policy mix to address systemic risk is less than optimal. There is anecdotal evidence that central banks that have no control over prudential tools may make overly aggressive use of reserves requirements to address risks from strong credit growth, when a mix of prudential tools may be more efficient in that regard.[36] The central bank may also be prone to overinvest resources in the preparation

[34] See Bordo et al (2011).

[35] See, for example, Large (2004), "Why We Should Worry about Liquidity", Financial Times, Nov 11. Additional coordination problems can arise when consumer protection objectives and conduct of business functions are integrated with the separate prudential regulator. Such a combination can distract attention from systemic risk objectives on the part of the prudential regulator, especially in long periods of calm.

[36] The issue was examined in detail by the Turkey FSAP Update.

of published FSRs, which, while often containing useful information for market participants, are not likely in and of themselves to lead to a substantial reduction in systemic risk. Indeed, there is evidence that central banks that *do not* have a prudential function are *more likely* to issue such reports (Ingves, 2011), perhaps in an effort also to influence other policymakers.

Box 4. Central Banks and Prudential Policy: Integration Versus Separation

The main text, as well as Box 2 reviews a number of conceptual arguments that point to the benefits of greater institutional integration between central banks and supervisory agencies for the effectiveness of systemic risk mitigation. This box complements this analysis by reviewing some evidence on whether the degree of institutional separation between central bank and supervisory agencies has the potential to affect policy outcomes.

Strong empirical evidence on the effect of the institutional structure is hard to come by for three main reasons. First, the institutional structure is only one of many factors that are likely to affect the frequency and severity of crisis outcomes across countries. Second, crisis outcomes themselves are rare tail events and the number of observations available for analysis is therefore typically small. Third, institutional structures vary in a number of subtle ways that are not all easily captured by empirical analysis.

Goodhart and Schoenmaker (1995) is one of very few existing studies to examine the effect of the institutional structure on outcomes. They analyze a sample of 104 (large) bank failures that occurred across 24 countries in the 1980s and early 1990s. Of the 24 countries, 11 countries had an integrated regime and 13, a separated regime during the 1980s. Goodhart and Schoenmaker apply statistical tests to determine whether significant differences between observed and expected failure rates under each regime. They find that countries with integrated regimes experience significantly fewer failures.

We go on to examine whether or not such a pattern can also be observed for the recent crisis experience when we look across countries. We examine three measures of the depth of crises, each scaled by GDP and sourced from Laeven and Valencia: (i) bank failures, measured as the fraction banking system assets of failed banks; (ii) the amount of capital support made available by the authorities; and (iii) the dollar amount of financial guarantees provided by the authorities to the banking system.

A first observation is that, by these measures, it is not the case that each and every country with integrated arrangement had a milder crisis experience than each and every country with separated arrangements (Appendix V and VI). Thus, for example, in advanced Europe, the Netherlands appears to have had a worse crisis than some of the countries with separated arrangements. And in the larger "world" sample Australia, appears to have had a milder experience than many countries with integrated arrangements. This suggests that the institutional arrangements cannot be claimed to be the only factor affecting crisis outcomes.

Since there are other potential drivers of crisis outcomes a pertinent question is whether one group of countries might have fared better *on average*, than the other group. Inspection of the charts suggests this to be the case. Across all three measures employed (failed banking assets, capital injections, and guarantees) the group of countries with close integration between central bank and banking supervisory agencies show a lower mean than those countries with separated arrangements. This evidence is somewhat stronger for advanced Europe than it is for the larger world sample, presumably because advanced Europe provides for a more homogenous sample.

In more formal regression exercises we introduce the current account position in the years leading up to the crisis (2004-2006), since previous research has pointed to the strength of capital inflows ahead of the crisis as an important macroeconomic driver of the build-up of financial imbalances ahead of the crisis (Merrouche and Nier, 2010). We find that, when the current account position is accounted for, a statistically significant difference emerges between groups across all three measures employed (text table).

We finally investigate the interaction between the strength of capital inflows and the degree of integration. This is a useful exercise since evidence based on interactions is less likely to be affected by omitted variables that can plague cross-sectional analysis. The finding here is that while current account deficits led to a worsening of crisis outcomes on average, this relationship becomes much weaker for those countries where there was stronger integration between central banks and banking supervisory agencies (text table, columns 4–6). In other words, where there was a more integrated structure this appears to have helped to attenuate banking sector vulnerabilities associated with strong capital inflows. While the number of observations is small it is noteworthy that these results hold across all three measures of the depth of the crisis, reducing concerns regarding the robustness of the finding.

Advanced Europe	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Failed	Injection	guarantees	Failed	Injection	guarantees
Dummy: Supervisor within CB	-0.269**	-2.769**	-58.34*	-0.206*	-2.812***	-59.40*
(1=within)	(0.0318)	(0.0128)	(0.0788)	(0.0518)	(0.00246)	(0.0513)
Current Account Surplus	-1.807**	-9.722	-313.5	-2.645***	-21.08***	-589.9**
	(0.0187)	(0.137)	(0.137)	(0.00136)	(0.00481)	(0.0251)
Dummy*Current Account				3.440**	28.68**	697.8*
				(0.0208)	(0.0115)	(0.0785)
Constant	0.255***	4.124***	62.72***	0.275***	4.722***	77.27***
	(0.00209)	(2.76e-05)	(0.00801)	(0.00033)	(2.30e-06)	(0.00214)
Observations	16	14	14	16	14	14
R-squared	0.429	0.444	0.275	0.641	0.715	0.476

pval in parentheses

*** p<0.01, ** p<0.05, * p<0.1

The evidence presented in this box is suggestive only since it is difficult in cross-sectional analysis to control for all potential drivers of crisis outcomes. Nonetheless, the findings reported here are broadly consistent with recent evidence provided by Merrouche and Nier (2010). Their paper offers a fuller investigation into the causes of the buildup of financial imbalances, by examining the pre-crisis period (1999–2007) for Organization for Economic Cooperation and Development (OECD) countries in a panel data setup, resulting in a much larger number of observations across countries and time.

Merrouche and Nier (2010) found that the buildup of financial imbalances (measured by the ratio of loans to deposits) was stronger where current account deficits were wide. They also found that the institutional structure mattered. Where the central bank had full control of supervision and regulation, the buildup of imbalances was less severe, controlling for a range of other country characteristics. Moreover, in interaction exercises they found that the impact of capital flows on the buildup of financial imbalances was weaker for those countries where the central bank had full control of supervision and regulation, consistent with the findings reported in this Box. Finally, their results point to a number of additional factors that affected the buildup of financial imbalances. In particular, the strength of supervisory and resolution powers was shown to be very important.

The main mechanism to address some of these weaknesses is the establishment of a coordinating committee, present in models 5 and 6, but absent in model 7. Such a committee, often set out in an MOU, can facilitate the exchange of information between agencies and foster the engagement on the part of each agency with the shared goal of financial stability.

Debate among agencies can clarify differences in perspectives and help create a well-founded consensus on what policy action is appropriate in any given conjuncture. A coordinating committee may help spot weaknesses in the supervisory regime for specific institutions or groups of institutions whose systemic importance requires a tightening of standards, and to identify and address other supervisory gaps. Finally, it can help in coordinating communication strategies across several agencies. However, a coordinating committee may not be able to fully address deep-rooted accountability and incentive problems that remain a concern for the effectiveness of models 5–7.

V. Mechanisms to Address Weaknesses of Models

Even as the tally of strengths and weaknesses differs across models (Appendix III), the analysis suggests that each model has potential weaknesses. Some of these weaknesses can be addressed by additional mechanisms that can be introduced to strengthen the model (see also Appendix IV). In general, since different models have different weaknesses, the appropriate compensating mechanisms will also differ. On the other hand, some mechanisms will be useful additions across several models and are likely to enhance effectiveness of macroprudential policy more broadly.

A. Mechanisms to Discipline Independent Use of Strong Powers

In models where strong and independent powers are assigned to a single agency or a single decision maker, there is a need for mechanisms to discipline the use of these powers. The main mechanisms to achieve such discipline are the mandate of the policymaker, the accountability framework established for macroprudential policy, and the composition of the decision making committee.

The mandate needs to be established in law and open up and at the same time constrain discretionary use of powers. This is to ensure the policymakers fully considers policy costs and trade-offs, such as a potential adverse effects of macroprudential policy on economic growth or the interests of stakeholders (IMF, 2011a and Nier, 2011). [37] The new (proposed) mandates of the authorities in Ireland, the United Kingdom and the EU contain such secondary objectives, while specifying that mitigation of systemic risk is the primary objective.[38]

When decision making is concentrated in the hands of a single body, strong transparency and accountability arrangements can compensate for a lack of internal "checks and balances." These mechanisms can allow for adequate scrutiny on the part of third parties, such as the

[37] For example, a secondary objective could be to ensure that macroprudential action does not unduly impair the capacity of the system to contribute to balanced growth.

[38] In general, it is useful to define objectives with respect to a specific policy function. Thus for example, when mitigation of systemic risk is the main objective of macroprudential policy, this does not take away that the main objective of monetary policy should remain price stability (IMF, 2010, and Nier, 2011).

parliament or the public. However, accountability and policy autonomy need to be carefully balanced, since accountability mechanisms can be used by interested parties to influence policy outcomes, reducing policy effectiveness. Accountability should not unduly undermine the willingness of macroprudential authorities to address systemic risk or compromise the established independence of other central bank functions, including monetary policy.

Accountability for macroprudential policy cannot easily be tied to outcomes and needs to focus instead on processes (Ingves, 2011). This might include (i) an ex ante communication of the policymakers' overall strategy; (ii) a detailed communication of the deliberations that led to particular policy decisions; and (iii), an *ex post* assessment of the effectiveness of action taken. All three of these elements are present in the new arrangements in Ireland and the United Kingdom. For example, in Ireland the central bank is required by law to publish an annual plan of regulatory initiatives, including their aims and objectives. In the United Kingdom, a published record of meetings of the FPC must specify any decisions taken by the committee and set out a summary of the committee's deliberations. The FPC is also required to publish an FSR twice a year which, unlike previous reports, will include three elements: (i) an assessment of risks to financial stability; (ii) a summary of the activities of the FPC over the reporting period; and (iii) an assessment of the effectiveness of actions taken by the FPC over the reporting and previous periods. The *Annual Performance Statement* of the Central Bank of Ireland also contains these elements.

Internal checks and balances can finally be enhanced by balancing the composition of an internal decision making committee. For example, the committee can comprise supervisory agencies, including those that are not part of the central bank. In addition the committee can feature independent experts, as envisioned for the new arrangements in the United Kingdom. Where there is a concern as regards confidentiality of data, dedicated advisory committees can be created, as in the EU setup, where there is a dedicated Scientific Advisory Committee to the ESRB.

B. Mechanisms to Compensate for Separation of Decisions from Control over Instruments

In models where there is institutional separation of policy decisions from control over instruments, mechanisms are needed to ensure implementation. Effective mechanisms are difficult to design since they should at the same time respect the operational autonomy of those agencies that have direct control over policy instruments.

One possibility is to vest the macroprudential authority with binding powers over specific and well-defined macroprudential instruments that are carved out of the policy domain of a separate regulatory authority. In the United Kingdom, such instruments will be defined by an order granted by the treasury and approved by a resolution of Parliament. When directions regarding these instruments are issued to constituent agencies, such as the prudential and the financial conduct agencies, these agencies will be required to implement the direction. One example is the dynamic capital buffer where policy decisions will rest with the FPC and implementation and enforcement with the prudential regulator (within the Bank of England).

But instruments could also be created that are in the domain of securities regulators. One example is the use of margin requirements in repo markets.

An alternative mechanism is the power to issue nonbinding "recommendations" to the separate authority, as established for the FPC in the United Kingdom, the FSOC in the United States, and the ESRB in the European Union. To increase the chance that the separate authority acts on the recommendation, recommendations are typically subject to a formal "comply or explain" mechanism (e.g., in the European Union, United Kingdom, and United States). Publication of recommendations, as envisaged as a rule for recommendations issued by FSOC, are another powerful mechanisms to ensure follow-up on the part of separate regulatory authorities. Membership on the decision making bodies of agencies who are asked to implement decisions may create greater ownership of decisions taken and increase compliance with recommendations (by involvement in analysis and formulation of policy decisions). Compliance can also be enhanced when macroprudential policymakers are given membership on the Board of implementing institutions. The power to issue specific recommendations to regulatory agencies can be complemented by a requirement of separate agencies to consult the committee when regulatory changes may have a bearing on financial stability.

Recommendations are a useful tool also when effective mitigation of systemic risk requires a change in the law. Important examples are changes in law that may be required to establish or strengthen regulatory and supervisory powers e.g., by providing for new tools, or to expand the regulatory perimeter. For example, the ESRB can address its recommendations to the European Commission or the European Parliament, so as to effect changes in the EU law. In the United Kingdom, similar recommendations can be addressed to the treasury, for it to follow up in the legislative process. Finally, the macroprudential framework needs to enable policy coordination beyond the use of financial regulatory tools and extend its reach to fiscal, exchange rate, housing market and competition policy (IMF, 2011a). In these areas, once again, non-binding advice and recommendations can be useful tools. For example, the new arrangements in Ireland provide for a specific objective on the part of the central bank to provide "analysis and comment to support national economic policy development."

C. Mechanisms to Address the Risk of Delayed Action

In a number of models, a key weakness is the risk that decisions may be subject to delay. This risk is greater where the committee's membership is large, as in the ESRB, where the General Board comprises 37 voting members, or where the treasury occupies a strong role (as in models 3 and 6).

Careful design of voting arrangement can reduce the risk that no action is taken as a result of persistent disagreement between constituent agencies or political economy pressures. As a rule, such voting should be subject to a simple majority or a qualified majority rule rather than requiring unanimity among all constituent agencies. This can reduce the scope for a single agency or the treasury to block policy action when such action is needed to mitigate systemic risks. In addition it may be useful to ensure a strong voice of the central bank on the

policymaking or coordinating committee. For example, in Mexico, the central bank has three voting seats on a ten-strong committee (chaired by the treasury).

Clearly distinguishing the set up for macroprudential policy and that of crisis management can reduce the need for strong treasury involvement.[39] Treasury departments naturally play a strong role in crisis management, while their role in macroprudential policy comes with greater costs. Establishing a crisis management committee (chaired by the treasury) alongside the macroprudential committee (chaired by the central bank) is useful to realize differences in the benefits and costs of a strong role of the treasury across these policy functions (Nier, 2011).[40]

Another element can be the appropriate design of accountability mechanisms. In the United States, for example, both the FSOC and each of its members, including importantly the Federal Reserve, must testify before Congress that in their view *all agencies* have taken sufficient action to address systemic risk.

D. Mechanisms to Address Lack of Cooperation in Risk Assessment and Mitigation

A key weakness of a number of models is the potential lack of cooperation between agencies whose contribution is needed for successful macroprudential policy. As set out above, establishment of a formal coordinating committee, as in models 5 and 6, can help to mitigate this risk. Such a coordinating committee can also be useful to address overlaps and gaps. It may help identify and reduce gaps and overlaps in risk identification and create a mutual understanding on which agency should tackle a problem that might otherwise fall between the cracks. Indeed, where such a committee is absent or not formally established, as in Iceland, Korea, Peru, and Switzerland (model 7), there is currently a strong debate on how to ensure effective macroprudential policy. In addition, in general, where there are multiple agencies, it can be desirable that each agency's objectives include the mitigation of systemic risk. This increases the chance of engagement and makes it more likely that a sufficient amount of resources is made available to support macroprudential policy.

Formal arrangements that are set out in law and are more visible to the public can enhance these benefits. In particular, more formal arrangements may enable the issuance of public warnings on the part of the committee as well as recommendations to take action that are issued to constituent agencies, as in Mexico. This can foster effective use of macroprudential

[39] The responsibilities of potentially separate macroprudential and crisis management committees need to be clearly delineated. There may need to be close coordination between both committees in crisis times, e.g., when there is a need to release countercyclical measures, such as dynamic capital buffers which would remain the responsibility of the macroprudential committee.

[40] To avoid crisis management and resolution functions becoming unduly politicized, involvement of the treasury in this policy area is usefully balanced by a role of independent agencies, such as the central bank or a separate resolution authority. Establishment of special resolution regimes and dedicated resolution funds can diminish the need for a routine involvement of the treasury even if it will need to be involved whenever resolution decisions involve the commitment of public funds (Nier 2009 and 2011).

policy instruments even where such recommendations are not binding on the agency. For example, a constituent agency might have shied away from taking action for fear of industry opposition. In the presence of a recommendation on the part of the committee it may be easier for the agency to face this opposition. Indeed, in these circumstances it is conceivable that the constituent agency "asks" for a public recommendation (Nier and Tressel, 2011).

Other mechanisms revolve around changes in legislation that affect common access to data. One important mechanism is to remove specific legal impediments, such as confidentiality requirements that prohibit the sharing of information beyond organizational boundaries. In addition, it can be useful to establish a formal duty to pro-actively make available all information needed to assess systemic risk. Alternatively, or in addition, the law can provide for the power on the part of the committee to request any information that may be available to separate agencies (as in the new the United Kingdom model). As a back stop, the committee (or constituent agencies) can be given powers to collect such information directly from firms. For example, in the United States, the Federal Reserve Board has been given a new authority to examine and obtain reports from subsidiaries of bank holding companies that are supervised by another primary regulator. The OFR has broad powers to collect information even from firms that are not subject to formal regulation and supervision. It is important that data collected are available to all agencies, e.g., through establishing a joint database, as in Australia.

VI. CONCLUSION

Progress in establishing macroprudential frameworks is being made, but is uneven across countries. A number of countries have made strides to overhaul their framework for financial regulation and supervision in ways that accommodates the setting up of a strong macroprudential policy function. The impetus for reform appears stronger in countries that were hard hit by the crisis, such as Belgium, Ireland, the United Kingdom, and the United States, but change is occurring also in other countries, such as France, Malaysia, and Mexico.

The crisis shows that while greater financial integration and ever more dynamic and sophisticated financial markets have key benefits, they can become a threat to global economic and financial stability when effective macroprudential policy frameworks are absent or lacking at the national level. Financial crises can have devastating effects on economies which can compromise the solvency of sovereigns and spill across national borders, whether or not the country is small or large. Effective arrangements enabling the authorities to take preventive action are therefore strongly desirable for all countries, emerging or advanced.

"One size does not fit all" since arrangements need to take account of local conditions. Some cultures place a greater value on achieving a broad consensus before action is taken. In other countries checks and balances are seen as vital to control abuses of powers by technocrats, including the central bank. Moreover, existing institutional arrangements for financial regulation and supervision are often deeply rooted in history and shaped by the underlying legal framework. In some cases, the authorities will be mindful of high transitional costs

arising from a radical overhaul of institutional arrangements when the existing arrangements have not obviously "failed." In others, the choice of model may be subject to legal and constitutional constraints (see Box 5).

Box 5. Macroprudential Policy Frameworks: Does One Size Fit All?

This box explores whether for macroprudential policy a single institutional model is likely to work for a large number of countries, or whether it is the case that for macroprudential policy, "one size does not fit all", by examining which local considerations are most likely to affect the choice of model.

Availability of Resources. Greater availability of resources, including a range of technical know-how and the ability of institutions to pay highly trained staff and attract high-quality management, is likely to benefit effectiveness of macroprudential policy. In countries where qualified staff are difficult to find, such as in many emerging markets economies or low-income countries, there may be a greater benefit to concentrating available resources institutionally. By contrast, this aspect is likely to be a second-order consideration in a number of advanced countries, even though if anything, fiscal constraints that emerged as a result of the crisis may argue for solutions that reduce duplication.

Monetary policy regime. At the margin, the choice of model may be affected by the prevailing monetary policy regime. Where the central bank's actions in monetary policy are heavily constrained, for example when the country is part of a currency union or operates a currency board, this may reduce reputational cross-over from assigning the central bank a macroprudential policy function. In these cases also, less power is concentrated in the hands of a single institution. However in these cases, equally, some of the benefits of integrating the central bank and prudential functions, such as coordination between monetary and macroprudential functions are less pronounced (Nier 2009). And the concern that a strong role of the treasury in macroprudential policy might undermine monetary policy autonomy may also be somewhat weaker.

Size and complexity of the financial system. In principle the size and complexity of the financial system, as well as the level of competition between financial institutions may have a bearing on the choice of model (Goodhart and Schoenmaker 1995). On the other hand, the recent experience shows that in open economies, even relatively simple financial system can expand rapidly and become more complex, causing systemic risk. The best known example is Iceland, where the ratio of banking system assets to GDP rose from 200 percent to just under 1000 percent in the space of just a few years (2003 to 2008) with the expansion sourced mainly in wholesale funding markets. Product innovations in wholesale (e.g., credit default swaps) and retail markets (e.g., foreign currency denominated mortgages) can also change the nature and strength of interconnections within the financial system and the strength of macro-financial feedback in response to aggregate shocks, as was the experience of several countries in the recent crisis. Thus, as the size and complexity of the financial system can change rapidly, they may not be a material driver of the choice of institutional model.

History of existing institutional structures. There are numerous examples of the effect of history on institutional arrangements for financial stability. For example, Goodhart and Schoenmaker (1995) explain how historical differences in the role of central banks as providers of last resort support have shaped the extent to which central banks in Europe gradually assumed a supervisory and regulatory role. The experience differs in countries where central banks were created more recently. For example, in the United States, the National Banking Acts of 1863 and 1864 established federally chartered banks and the Office of the Comptroller of the Currency as a Department of the Treasury, to supervise and regulate these banks, well before the Federal Reserve was created in 1913. In Latin America, subsequent missions by the American Economist Edwin Kemmerer led to the creation of central banks and separate regulatory agencies in a number of countries (Chile, Colombia, Ecuador, and Peru). As set out in the main text, the

underlying institutional model, in turn, can have a bearing on which institution is assigned the macroprudential mandate.

Legal traditions. Legal traditions are likely to influence the choice of model. For instance, constitutional protection of agency autonomy may be a legal obstacle for any model that includes binding instructions from one agency to another. This consideration appears to have shaped the arrangements in Mexico, where the new committee cannot issue binding directions to constituent agencies; and those in Chile, where the central bank has an observer status only on the macroprudential committee, so as to protect its independence.

Political economy. Financial sector regulation has all three characteristics of a policy field, where delegation to an independent decision maker is useful: it is characterized by political economy problems, requires technical expertise and is subject to strong lobbying of special interest groups. Nonetheless societies may differ in their willingness to delegate decisions to technocrats, including central banks, and may in some cases prefer greater political debate and in-built checks and balances.

In sum, the available resources, the history of existing arrangements, legal traditions and the political economy are four factors that are likely to have a strong effect on the choice of model. By contrast, the size and complexity of the financial system and the existing monetary policy framework should be expected to have only a relatively mild effect on choices between models.

While the choice of institutional arrangements for macroprudential policy must meet country-specific constraints, this does not imply that all institutional models are equally conducive to effective macroprudential policy. Indeed, while each of the stylized models assessed in the paper has strengths and weaknesses, there are differences across models in their tally of pros and cons (see also Appendix III). Often, weaknesses can be addressed by introducing additional safeguards or mechanisms. But equally, these mechanisms may not always work well enough to fully restore the effectiveness of the model or turn a weakness into a strength.

Moreover, while informal arrangements can work well, they are less resilient to non-cooperative behavior of people, which can be observed in every society. Informal ties and a strong culture of cooperation can support flexible adjustment to changing conditions. However, formalization of processes in the form of institutions or mechanisms may limit risks connected with changes in key people and incentives as well as the quality of personal relationships.

The objective of the paper is not to single out a "preferred" model, but to indicate the conditions that should be met for any given model to work well. We therefore distill general and more specific lessons that can translate into basic guidance for those countries that are reviewing their existing frameworks. Some general lessons are as follows.

- *The central bank should play an important role in macroprudential policy,* so as to harness institutional incentives and expertise available at the central bank and assure coordination with other central bank functions, including monetary policy, provision of liquidity, and payment systems oversight.

- *Complex and fragmented regulatory and supervisory structures are unlikely to be conducive to effective mitigation of risks to the system as a whole.* Fragmentation can reduce effectiveness of risk identification and increases the likelihood that the financial system develops in ways that poses risks to the stability of the system as a whole. Fragmentation can also introduce frictions due to the need for collective decision making and can reduce the chance that risk identification translates into forceful action. Where microprudential, conduct and securities market supervision are housed outside the central bank, institutional bridges that span these policy functions can aid risk identification and mitigation.

- *Participation of the treasury is useful, but a dominant role poses important risks.* Participation of the treasury in macroprudential policy is useful to ensure a bridge to the legislature and bring in fiscal policy issues. However, a dominant role risks delay in taking macroprudential action in good times, for political economy reasons similar if not stronger than those arguing for a limited role in monetary policy. A dominant role can also compromise the institutional independence of established policy fields, such as monetary and supervisory policy.

- *Systemic risk prevention and crisis management are different policy functions that should be supported by separate arrangements.* The treasury more naturally assumes a strong role in crisis management, even though independent agencies can usefully balance this role. To meet both demands it may be desirable in many cases to establish the macroprudential policy arrangements as separate from the crisis management framework.

In the area of effective identification, analysis and monitoring of systemic risk, consideration should be given to the following specific aspects.

- *Mechanism for effective sharing of information should be in place.* Availability of all data and information needed to assess systemic risks should be assured, by removing existing legal obstacles to the sharing of data, and the setting up of mechanisms for data collection and centralization of information. All parties with access to relevant data should act pro-actively to provide information needed to assess systemic risk.

- *At least one institution involved in the analysis of systemic risk should be provided access to all available data and information.* Given the complex nature of evolving interactions within the financial system, partial analysis undertaken by multiple agencies cannot assure the same depth of assessment.

- *Existing expertise should be leveraged.* As the assessment of systemic risk involves complex analysis of the financial system as a whole and its interactions with the economy, central banks will often be well placed to take the lead in risk assessment.

- *All agencies disposing of relevant knowledge and information should be involved in the process.* And mechanisms should be established to challenge dominant views of one institution.

In order to provide for timely and effective use of macroprudential policy tools the institutional setup should promote the following specific aspects.

- *The institutional mechanisms should promote willingness to act and reduce the risk of delayed policy action.* The legal framework should establish a formal mandate and accountability for timely and effective macroprudential policy action.

- *The macroprudential mandate should be assigned to a single institution, body or decision making committee that can be held accountable for meeting its objective.* Establishing financial stability in the mandate of several institutions is useful to ensure collaboration with the main body or policy committee. However, distributing the macroprudential mandate across several bodies can lead to collective action problems that reduce accountability and incentives and that are difficult to overcome in practice.

- *The mandate should be given to institutions whose other objectives are closely aligned with the objective of macroprudential policy* and for which the cost of inaction in terms of meeting the institution's other objective is high. As already highlighted, this argues for a strong role of the central bank, alongside other regulatory agencies, whereas the treasury's involvement should be more limited.

- *The mandate needs to be complemented by appropriate powers.* This includes powers to obtain information, to take or initiate regulatory action and to initiate changes in the regulatory perimeter.

- *Mandates and accountability mechanisms should guard against overly restrictive macroprudential policy.* To constrain discretionary use of powers, the mandate itself may specify secondary objectives and needs to be flanked by strong accountability. Accountability mechanisms can require a high degree of transparency, including publication of a policy strategy, communication of decisions and *ex post* assessments of effectiveness.

- *Accountability mechanisms should be designed in a manner that does not unduly compromise effectiveness of macroprudential policy.* Mechanisms should not give undue room for special interests to lobby for overly accommodative macroprudential policy.

In order to ensure effective coordination across policies without undermining the established autonomy of separate policy fields the following aspects are desirable.

- *Institutional integration of financial regulatory functions within the central bank can support effective coordination of macroprudential policy with monetary as well as microprudential policy, but also requires safeguards.* Macroprudential policy frameworks should not become a vehicle to compromise the independence of monetary policy. Separate accountability mechanisms for monetary and macroprudential policy are likely to be useful in many cases.

- *Institutional separation of policy decisions and control over policy tools should generally be avoided.* In their presence, mechanisms are needed to ensure powers to "direct" the action of constituent or other agencies while preserving their institutional autonomy. These can take the form of nonbinding recommendations, coupled with a "comply or explain" mechanism. An alternative is to carve out specific macroprudential instruments and assign their use to the macroprudential decision maker.

- *Where decision making powers are distributed among several agencies, establishing a coordinating committee is useful.* A coordinating committee can help the authorities to come to a shared appreciation of risks, to help establish consensus on the appropriate policy mix and to identify overlaps and gaps. However, such a committee is not necessarily sufficient in overcoming the lack of overall accountability for policy outcomes in the presence of a "commons" problem.

While the analysis of this paper provides steps towards a framework for country-specific advice, further study of important aspects appears useful, including on (i) country specific conditions affecting the choice of institutional model; (ii) trade-offs between precision and flexibility of mandates and powers; (iii) trade-offs between policy autonomy and policy accountability; and (iv) mechanism to effect the proper flow of information and address incentive problems when there is institutional separation between agencies. These will remain challenging issues as countries are developing their macroprudential frameworks, and may be amenable to further study and debate.

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Appendix I. Supervision of Banking, Securities, Insurance, and Payments in Surveyed Countries

	Banking		Securities	Insurance	Payments Oversight		
Argentina	CB		S	I	CB	Legend	
Australia		B	S	B	CB	CB	Central Bank
Austria	CB	B	B	B	CB	B	Banking Supervisor
Belgium (new)	CB		S	CB	CB	S	Securities Supervisor
Brazil	CB		S	I	CB	I	Insurance Supervisor
Bulgaria	CB		SI	SI	CB	SI	Securities and Insurance Supervisor
Canada		B	S	B	CB	G	Government
Chile		B	SI	SI	CB		
China		B	S	I	CB		
Colombia		B	S	B	CB		
Czech Rep.	CB		CB	CB	CB		
Finland		B	B	B	CB		
France (new)	CB		S	CB	CB		
Germany	CB	B	B	B	CB		
Greece	CB		S	G	CB		
Hong Kong SAR	CB		S	I	CB		
Hungary		B	B	B	CB		
India	CB		S	I	CB		
Indonesia	CB		S		CB		
Ireland (new)	CB		CB	CB	CB		
Italy	CB		S	I	CB		
Japan		B	B	B	CB		
Jordan	CB		S	I	CB		
Lebanon		B	B	G	CB		
Malaysia	CB		S	CB	CB		
Mexico		B	B	I	CB		
Mongolia	CB		SI		CB		
Netherlands	CB		S	CB	CB		
New Zealand	CB		S	CB	CB		
Nigeria	CB		S	I	CB		
Norway		B	B	B	CB		
Paraguay	CB		S	CB	CB		
Peru		B	S	B	CB		
Philippines	CB		S	I	CB		
Poland		B	B	B	CB		
Portugal	CB		S	I	CB		
Romania	CB		S	I	CB		
Russia	CB		S	I	CB		
Serbia	CB		S	CB	CB		
Singapore	CB		CB	CB	CB		
Slovak Rep.	CB		CB	CB	CB		
South Africa	CB		SI	SI	CB		
Spain	CB		S	I	CB		
Sweden		B	B	B	CB		
Switzerland		B	B	B	CB		
Thailand	CB		S	I	CB		
Turkey		B	S	I	CB		
UK (old)		B	B	B	CB		
Uruguay	CB		CB	CB	CB		
US	CB	B	S	I	CB		

Appendix II. Use of Selected Macroprudential Instruments in Surveyed Countries

	Caps on loan-to-value ratios	Caps on debt-to-income ratios	Countercyclical/ dynamic provisioning	Ceiling on credit growth	Countercyclical/time-varying capital requirements
Without Mandate					
Australia					
Austria					
Belgium					
Canada	X				
Chile	X				
Colombia	X	X	X	X	
Czech Republic					
Finland					
Germany					
India			X		X
Indonesia					
Ireland					
Italy					
Jordan					
Malaysia	X			X	
Mexico	X				
Netherlands					
Norway	X	X			
Peru			X		
Philippines					
Poland		X			
Portugal					
Russian Federation			X		
Serbia		X		X	
Singapore	X			X	
Sweden	X				
Switzerland					
Turkey	X				
United Kingdom (old)					
With Mandate					
Argentina					
Brazil	X				
Bulgaria			X		X
China	X				
France					
Greece					
Hong Kong SAR	X	X			
Hungary	X	X			
Japan					
Lebanon	X				
Mongolia					
New Zealand					
Nigeria				X	
Paraguay					
Romania	X	X			
Slovakia					
South Africa					
Spain			X		
Thailand	X	X			
United States					
Uruguay			X		
Source: 2010 MCM survey.					

Appendix III. Summary of Strengths and Weaknesses of Stylized Models

Criteria for assessments and their specific aspects	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
1. Provide for effective identification, analysis and monitoring of systemic risk, including through							
a. facilitating the flow of information needed for risk assessment	☺☺	☺	☺	☺	😐	😐	☹
b. facilitating full use the existing analytical expertise needed for risk assessment	☺☺	☺	☺	☺	😐	😐	☹
c. promoting comprehensive assessment of risk by matching information and expertise	☺☺	☺	😐	☺	☹	☹	☹
d. challenging dominant views of one institution	☹☹	☺	☺	☹	😐	😐	☹☹
e. facilitating the use of the best existing expertise in communicating risk	☺	☺	😐	☺	😐	☹	☹
f. favoring clear communication of risks	☺☺	☺	😐	☺	😐	😐	☹
2. Provide for timely and effective use of macroprudential policy tools, by							
g. clearly allocating mandate and accountability	☺	☺	😐	☺	☹	☹	☹
h. assigning responsibility to an institution, that has clear incentives to act due to high costs of inertia for meeting its other goals	☺	☺	☹	☺	😐	😐	😐
i. limiting risk of delayed action due to the political cycle	☺	☺	☹	☺	😐	☹	☺
j. limiting risk of delayed action due to separation of decisions and control over tools	☺	😐	☹	😐	☺	☺	☺
k. avoiding risk of delayed action due to problem falling between the cracks (existence of regulatory gaps, different objectives and accountabilities)	☺	😐	☹	😐	☹	☹	☹☹
l. fostering ability to acquire new policy powers (tools, perimeter) when systemic risk migrate	☹	😐	☺	☹	😐	☺	☹
m. preventing lower policy effectiveness due to creation of a large and multi-functional organization	☹	😐	😐	😐	☺	☺	☺

3. Provide for effective coordination across policies to address systemic risk, while preserving their autonomy							
n. coordination between macroprudential policy and monetary policy	☺☺	☺	😐	☺☺	😐	😐	☹
o. coordination between macroprudential policy and microprudential policy	☺	☺	☺	☺	😐	😐	☹
p. coordination between macroprudential policy and fiscal policy	☹	😐	☺☺	☹	😐	☺	☹
q. of separate policies	☺	☺	☹	☺	☺	☹	☺
4. Other aspects							
r. concentration of power	☹	😐	☺	😐	☺	☺	☺
s. cross-over of reputational risks across central bank monetary and prudential functions	☹	☹	☹	☹	☺	☺	☺

1/ Relative ranking should be read horizontally.

Note: Country-specific circumstances and existence of compensating mechanisms mean that the strengths and weaknesses of real-life models can differ from those indicated in this table.

Appendix IV. Examples of Mechanisms, that can be Applied to Address Some of the Weaknesses of the Models

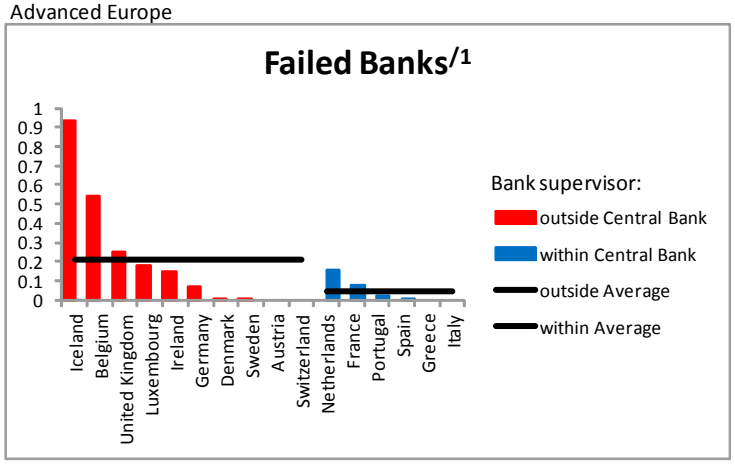
Criteria	Weakness identified	Examples of additional mechanisms to address weaknesses
Provide for effective identification, analysis and monitoring of systemic risk	Insufficient access to information and data (when there is a separation of central bank and supervisory agencies),	• Engage in the policy process all authorities that have information and data on institutions, markets and products • Remove legal obstacles to the sharing of information • Establish a legal requirement to pro-actively share relevant information (e.g., Canada) • Create right to obtain data directly from firms (as a back stop) • Centralization of financial databases in existing institution (Australia) or by creating new dedicated institution (like OFR in the United States) • Legal power to extend the scope of data collection by macroprudential authority (United States) • Give the policymaker a legal right to be informed on all planned decisions of other authorities which will affect the financial system or be source of systemic risk
	Sub-optimal use of relative strengths of existing organization in risk assessment	• Formally assign the function of comprehensive systemic risk assessment to the institution with the best know-how: other institutions should contribute by assessing risks in their domains
	Lack of mechanisms to challenge views when the decision making power is given to one institution (or multiple institutions without institutionalized coordination)	• Involvement of all authorities with access to relevant information and data at some part of decision making process • Add external members to the decision making bodies (the United Kingdom) • Establish a formal structure to provide external views (e.g., Advisory Scientific Committee of the EU ESRB) • Develop informal venues of exchanging views e.g., at more technical levels
	Lack of clarity of communication of risks (in the case of multiple agencies involved in policymaking process)	• Formally assign the function of risk communication to the institution with the best know-how
	Duplication of scarce resources (especially important in less developed countries)	• Formally assign the function of comprehensive systemic risk assessment to one institution with the largest relevant know-how: other institutions should contribute by assessing risks in their of domains
Provide for timely and effective use of macroprudential policy tools	Risk of delayed actions due to shared responsibility	• Establish and emphasize financial stability in the mandates of institutions • Establish a coordinating or policymaking committee • Provide for strong accountability frameworks (e.g., individual accountability of committee members) • Cross-membership of authorities governing bodies
	Risk of delayed actions due to multiple players (including overlaps, lack of agreement)	• Keep institutional structure simple • Presence of an ex-ante mechanism to make decisions in the areas

Criteria	Weakness identified	Examples of additional mechanisms to address weaknesses
		where competences *overlap* and it is difficult to identify who should take an action • Avoid unanimity requirements and establish simple or qualified majority voting • Individual accountability of committee members (United States)
	Delayed actions due to separation of decisions and control over tools	• Establish powers to issue formal recommendations with comply or explain mechanism or the power to direct the use of specific tools • Obligation (United States) or possibility (EU ESRB) of making recommendation and answers public • Cross-membership of authorities governing bodies • Individual accountability of committee members (United States)
	Delayed actions due to problem falling between the cracks (existence of regulatory gaps, other primary objectives)	• Keep institutional structure simple • Clearly identify which institution is the lead macroprudential authority and assign proper mandate and powers • Add financial stability objective to the mandate of all institutions involved in macroprudential policymaking and implementation • Cross-membership of authorities governing bodies • Establish a committee to decide who should cover a regulatory gap or whether closing the gap this needs legal change. • Establish ex-ante mechanisms that help to bring about legislative change as necessary • Individual accountability of committee members (United States)
	Delayed actions due to behavior of the Treasury	• Establish a crisis management committee alongside the macroprudential committee, with the treasury chairing the former. • Simple or qualified majority voting • Establish a strong voice for the central bank on a policymaking committee (Mexico) • Individual accountability of committee members (United States)
	Delayed actions due to the lack of new powers (tools, perimeter)	• Involve the Treasury in policymaking process in order to give it a better understanding of the need for new or expanded powers (even in a passive role) • Establish a legal right for the committee to designate institutions and infrastructure to enhanced oversight (United States) • Establish legal mechanisms (e.g., nonbinding recommendations) to government/parliament
	Need to guard against over-restrictive policy	• Add secondary objectives to the mandate, which will force the policymaker to take into account costs of its action in terms of damage to the ability of financial sector to contribute to medium and long term growth of economy (United Kingdom, Ireland) • Strong mechanisms of policy' accountability and transparency (e.g., publication of a policy strategy, publication of the record of meetings, regular reports to parliament)

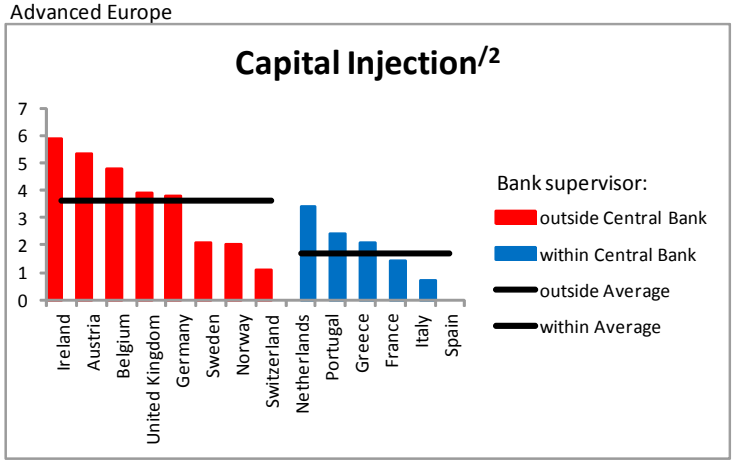
Criteria	Weakness identified	Examples of additional mechanisms to address weaknesses
		• Allow for external experts to have an influence on policy decisions
Provide for effective coordination across policies without undermining their autonomy	Weak coordination between macroprudential policy and monetary policy	• Cross-membership of macroprudential and MPCs • Informal exchanges of views • Regular interactions between analysts working on monetary and macroprudential policy
	Macroprudential policy may undermine independence of monetary policy	• Separate accountability frameworks for macroprudential and monetary policy • Avoid leading role of the government on a macroprudential committee
	Weak coordination between macroprudential policy and microprudential policy	• All supervisory agencies should be involved in discussions on risk identification and formulation of the policy response • Involve supervisory staff in systemic risk identification and analysis (to the extent possible) • Establish a coordinating or policymaking committee • Establish the power to issue recommendations with comply or explain mechanism or binding directions as regards well-specified and dedicated macroprudential tools • Emphasize financial stability in the mandate of the microprudential supervisor • Cross-membership of boards of institutions involved in macroprudential policy as a mechanism to encourage cooperation and coordination
	Weak coordination between macroprudential policy and fiscal policy	• Involve the treasury in the policymaking process or provide it regularly with up to date systemic risk assessment • Give macroprudential policymakers to right to make (non-binding) recommendations on specific fiscal issues and policies

Appendix V. Experience in the Recent Crisis (Advanced Europe)

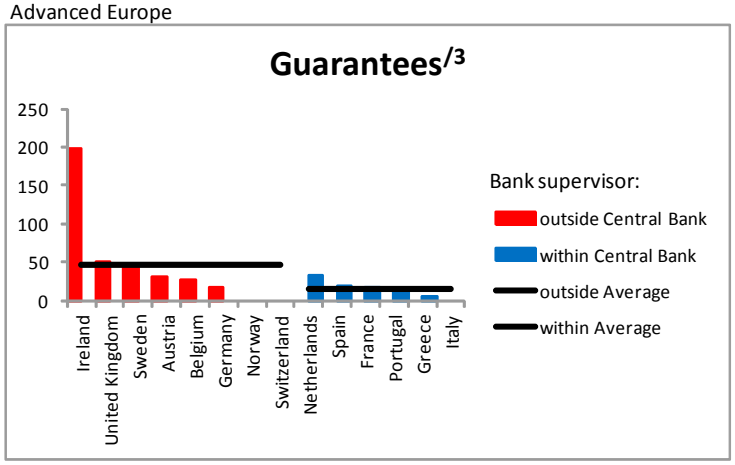
Advanced Europe



Advanced Europe



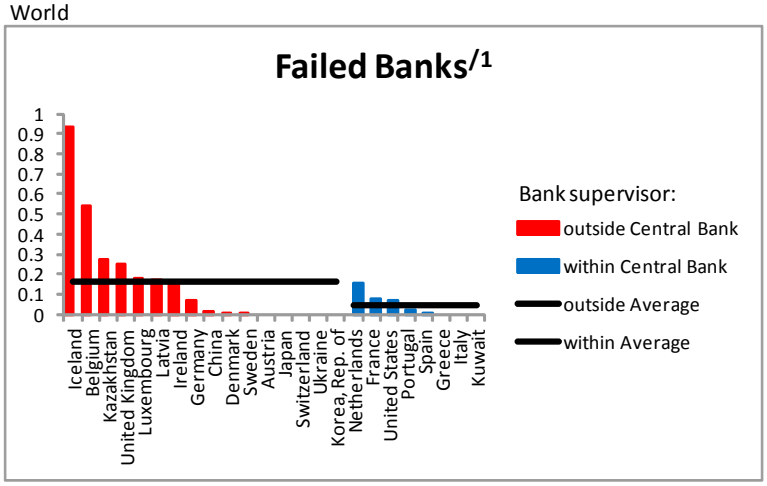
Advanced Europe



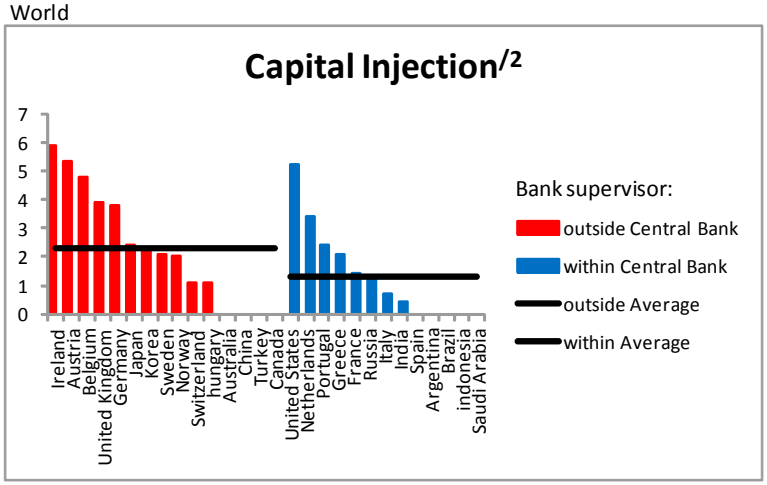
Sources: Laeven and Valencia (2010), and Claessens, Dell'Ariccia, Igan and Laeven (2010).
1/ Failed banks, fraction of total banking assets (%).
2/ Announced or pledged amounts, and not actual uptake.
3/ Announced or pledged amounts, and not actual uptake. Excludes deposit insurance provided by deposit insurance agencies.

Appendix VI. Experience in the Recent Crisis (World)

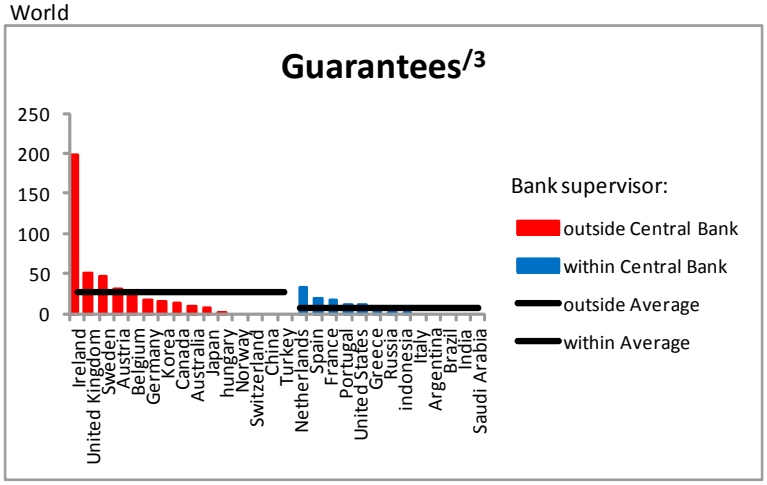
World



World



World



Source: Laeven and Valencia (2010), and Claessens, Dell'Ariccia, Igan and Laeven (2010).
1/ Failed banks, fraction of total banking assets (%).
2/ Announced or pledged amounts, and not actual uptake.
3/ Announced or pledged amounts, and not actual uptake. Excludes deposit insurance provided by deposit insurance agencies.