

# New Financial Stability Governance and Central Banks

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## 1. Introduction

Since the global financial crisis, countries have been assessing and reforming their regulatory structures, strengthening their microprudential policy regimes and creating or enhancing frameworks for macroprudential policies directed at system-wide or macro-level risks. Examples of such macroprudential frameworks are laid out in, among others, Bank of England (2009), CGFS (2010) and IMF (2011). These documents emphasise that the ultimate objective of macroprudential policy is the stability of the financial system as a whole, across all likely macroeconomic and credit market environments. The documents describe three components of macroprudential policy frameworks, specifically: (i) measuring and monitoring systemic risk; (ii) implementing policies to mitigate identified systemic risks; and (iii) establishing an institutional and governance structure for implementing policy.

This paper reviews progress on the third component – institutional arrangements and governance. We review public official documents for 58 economies to evaluate whether they have put in place arrangements to consider and implement pre-emptive macroprudential policies, that is, those aimed at reducing potential financial stability risks, particularly time-varying or cyclical systemic risks.

There are two reasons for the interest in frameworks for time-varying risks. The first is the concerns expressed in recent years about financial stability risks that could emerge from a sustained period of low interest rates, such as asset price bubbles and excessive risk-taking, which could leave banks and investors vulnerable to a fall in asset prices. These concerns have been the focus of many country and cross-country financial stability reports (FSRs), including the October 2016 International Monetary Fund (IMF) *Global Financial Stability Report* (IMF 2016) and the November 2016 report by a joint ESRB–ECB taskforce on macroprudential issues and structural change in a low interest rate environment (ESRB and ECB 2016).<sup>1</sup> The second is the fact that, though the arrangements to address structural risks, such as writing new regulations

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1 In late 2015, the Basel Committee on Banking Supervision Macroprudential Group undertook a detailed study of current macrofinancial risks and official sector responses that involved a review of member financial stability reports. This review found the most widely noted current concern among members to be the potential effect of the global low interest rate environment. These concerns related to both how the extended period of low interest rates and compressed risk premia could lead (and in some cases have led) to excessive risk-taking, asset price acceleration and a weakening in lending standards, and how low rates have promoted significant cross-border flows into emerging economies.

to enhance bank capital and liquidity, are generally grounded in the standing microprudential regulatory system, the governance framework for implementing macroprudential policies to address cyclical risks is new and less well established. Cyclical policies, including adjusting residential mortgage loan-to-valuation ratios (LVRs) or the new Basel countercyclical capital buffer, involve identification of emerging financial vulnerabilities such as high credit and compressed risk premia. As such, they may require the macro-based analytical skills of central banks (CBs) and the political judgements of the government, in addition to the expertise of prudential regulators (PRs).

In our review of the governance structures implemented to address cyclical financial stability risks, we look at the composition and leadership of financial stability committees, and whether they have separate tools or rely on the tools of their members. We also focus on the role of CBs as members of their economy's financial stability governance arrangements. Some international agencies, such as the IMF and Financial Stability Board (FSB), have argued for CBs to have a strong role in national financial stability governance structures because it will lead to greater consideration of macroprudential factors, reflecting CBs' expertise in setting monetary policy and in functioning as the lender of last resort.

Although the literature on governance structures for implementing macroprudential policies is small – a fact often remarked on by Tucker (2014, 2016) – a few papers have studied post-crisis macroprudential policy governance structures, albeit with a different emphasis to us. We briefly review these papers in Section 2. A 2010 IMF survey on financial stability and macroprudential policy (IMF 2011) is a major source of information for many previous studies, but a large number of countries have implemented changes to their macroprudential governance structures since 2010. For our analysis, as discussed in Section 3, we choose as a starting point for our sample the economies that have taken macroprudential policy actions that appear to be related to credit cycles, based on Cerutti *et al* (2016). This choice leads to a review of 58 economies as of 2016, with substantially more advanced economies relative to earlier studies, which had a greater focus on emerging market and developing economies. In addition, we retrieve information directly from national authorities' websites and FSRs, IMF Article IV reports and, where available, IMF financial sector assessment program (FSAP) reports. We perform significant crosschecks against other papers, though our measures of macroprudential governance structures are, nonetheless, based on our interpretations of public statements.

We find that nearly all economies now have institutional arrangements in place to monitor and communicate views about systemic risks, but they have made more modest changes to how they would take macroprudential actions. Of the 58 economies in our dataset, 41 have formal or de facto financial stability committees (FSCs). The chairs and co-chairs are almost always the ministry of finance (MoF) or the CB, and are rarely a PR. Another 15 economies have placed the responsibility for macroprudential policies with a single entity, almost always the CB, and many of these appear to have informal communication arrangements with other regulators or the government. Both sets of structures should facilitate better engagement between financial regulators and macro policymakers. And, consistent with Bodenstein, Guerrieri and LaBriola's (2014) finding that recognition by policymakers of other policymakers'

objectives can improve policy formulation, this may lead to better macroprudential outcomes. Interestingly, however, only 11 FSCs have separate tools, such as ‘comply or explain’, to direct macroprudential actions. The lack of separate tools may not be surprising given countries are building on pre-existing regulatory and legal systems, and may be unsure about the transmission and effectiveness of new macroprudential policies. Nonetheless, they raise the risk of inaction and ineffectiveness, as suggested by the Tinbergen separation principle, if new financial stability mandates conflict with existing separate mandates, such as the safety and soundness of banks or price stability.

We review research on the rationale for giving the CB a significant role in economies’ financial stability governance structures in Section 4. We then empirically examine determinants of the strength of the role of the CB or the MoF on the FSC in Section 5. We look at whether the role of CBs reflects interests in building on a CB’s expertise in the analysis of macroeconomic and cyclical developments. In particular, because two-thirds of the CBs are also PRs, we look at whether related informational advantages lead to a stronger role. Finally, since the implementation of time-varying macroprudential tools, like monetary policy, may be politically unpopular (the proverbial taking away the punchbowl), we look at whether CBs that are more politically independent are given a stronger role.

Consistent with previous studies, we find that CBs play an especially prominent role in financial stability governance. The CB is either a member of, or is the chair or co-chair of the FSC, or is the single agency with responsibility for macroprudential policymaking in all but two economies. Preliminary regression results suggest that the most significant determinants of having a governance structure where the CB is the single responsible agency are that the economy’s GDP is small, and that the CB is the PR for not only banks but also for broader parts of the financial system.

Nevertheless, if an economy sets up an FSC, the CB is less frequently the chair than is the MoF. Regression results suggest the MoF is more likely to be the chair in advanced economies with low credit-to-GDP ratios, while the CB is more likely to be the chair of the FSC in emerging market and developing economies, and in economies with high credit-to-GDP ratios. Moreover, surprisingly, and in contrast to previous research, we do not find that CBs are more likely to be the chair of the FSC when they are also a PR, suggesting informational advantages are not driving the committee structures. Thus, while CBs generally have a prominent role because they are a member of nearly all financial stability arrangements, they are the lead mainly in smaller countries or emerging market and developing economies.

Overall, the lack of separate tools for committees suggests that there is some risk – similar to the risk from the widespread growth in the past couple of decades in the production of FSRs – that current arrangements will lead to better monitoring and communication, but not necessarily better financial stability outcomes. Thus, on balance, our review suggests that, while greater coordination should be beneficial, attention should be paid to whether procedures are in place for FSCs to take actions when needed, especially if there are conflicts between traditional microprudential mandates of the individual agencies and a new financial stability mandate.

## 2. Previous Research on Governance Structures for Macroprudential Policies

The literature on governance structures for macroprudential policies is limited, but growing, and generally focuses on either what institutional structures are in place to support the implementation of macroprudential policy or what explains the choice of governance structures across countries. Policy papers by institutions like the IMF covering the topic of macroprudential policy governance structures in more general terms are quite prominent, alongside academic studies that typically focus on a few specific issues.

### 2.1 Identifying institutional structures

In general, the question of whether institutional structures are in place to support the implementation of macroprudential policy has received the most focus. Ultimately, the identification of the governance structures is intended to help answer questions about how to best structure the institutional set-up to identify system-wide risks and implement policies to mitigate risks, given that both processes require cooperation, at a minimum, across multiple autonomous agencies.

Nier *et al* (2011) provides a comprehensive summary of macroprudential institutional frameworks, based on IMF case studies and a 2010 survey with responses from 50 countries.<sup>2</sup> They group the institutional frameworks observed internationally into seven broad *types* and consider the capacity of these different types of framework to provide for: (i) the effective identification, analysis, and monitoring of systemic risks; (ii) the timely and effective use of macroprudential tools; and (iii) the coordination across policies to address systemic risks, while preserving autonomy of institutions. Within (iii), Nier *et al* note the potentially important role of the CB in supporting effective coordination of macroprudential policy with monetary policy as well as microprudential policy, although they caution that this could suggest a propensity to have a concentration of power in a single institution and the need for safeguards in this situation (an issue also considered by ESRB (2012) and Tucker (2014, 2016)). Also related to (iii), Nier *et al* (2011) note the importance of coordination and cooperation between agencies, supervisors, and the CB.

Lim *et al* (2013) use the database from Nier *et al* (2011) to develop measures of institutional set-ups for macroprudential policies in 39 countries (12 advanced and 27 emerging or developing), based on the respective roles of CBs and governments in macroprudential regulation. They define and calculate three indices: a macroprudential (MaPP) index, a microprudential (MiPP) index and a MoF index. The three indices are ranked from 1 to 4 to reflect the degree to which the CB is responsible for financial stability (the MaPP index) and for individual institution safety and soundness (the MiPP index), as well as the role of the government for financial stability (the MoF index).

2 They catalogue existing structures by five criteria: (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 organisational 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.

Lim *et al* (2013) document commonalities in institutional arrangements: for 62 per cent of their sample, the financial stability mandate is shared by multiple agencies and the CB is a member of the coordination body but is not the chair. The CB chairs the coordination body in 10 per cent of countries and is the sole owner of the financial stability mandate in 21 per cent of countries. For microprudential policy, they find that in 67 per cent of countries the CB supervises at least the banking sector, while in the remaining 33 per cent of countries the supervisory agency has this responsibility. With regard to the role of the MoF, they document that it is also a major player and coordinates the FSC in about 31 per cent of countries. Below we document that the role of the CB may have increased since the 2010 survey used by Lim *et al* (2013). We find this despite the fact that our sample includes a larger number of advanced economies, which are less likely to rely solely on the CB as the main financial stability authority.

Additionally, Lim *et al* use their measures of the strength of CBs and MoFs in the macroprudential policy framework to explain the timeliness of responses by financial stability authorities to emerging financial system vulnerabilities. They show that a stronger CB role is conducive to a quicker policy response.

Lombardi and Siklos (2016) also develop a measure of a country's capacity to implement macroprudential policy based on a large number of factors.<sup>3</sup> Some of these factors are similar to those in Lim *et al* (2013), such as factors related to the structure of countries' inter-agency financial stability coordinating bodies, including which bodies are the chair, which are the members, and what is the extent of the CB's involvement. But many factors go beyond inter-agency issues, such as: the CB's internal institutional set-up for financial stability; how the CB views the relationship between macroprudential and monetary policy; and CB communications on macroprudential policy and financial stability topics, which they interpret as capturing transparency and accountability. Some factors also seem to go beyond macroprudential policy, such as the country's deposit insurance regime. While they link capacity to various measures of financial stability – including credit growth, but also variance of real GDP growth and of inflation – they note that it may be difficult to formally evaluate whether capacity affects these measures. For example, they find a statistically significant positive relationship between their measure of capacity and credit growth, which they interpret as evidence that the institutional capacity is designed to deal with the financial stability challenges of credit growth rather than vice versa. Relative to Lombardi and Siklos (2016), our study of economies' frameworks for implementing macroprudential policy is more focused on FSC structures, which are largely inter-agency, and the role of the CB.

Smaga (2013) considers similar issues related to the role of CBs in FSCs and as the single agency with authority over macroprudential policy tools for a sample of 27 European Union (EU) countries, although he considers this question in the context of a much broader index of 'central bank involvement in financial stability'. This index, which builds on an earlier literature –

3 They summarise eight broad criteria, which are based on 30 elements: implementing macroprudential policy; coordination and responsibility for macroprudential policy; deposit insurance; transparency and accountability; organisational structure of the CB; view of the CB of links between monetary policy and macroprudential policy; distance to FSB/G20 recommendations; and response time to recommendations.

some of it, pre-crisis – takes a broader view of CBs' involvement in financial stability that includes their involvement in the payments system, in microprudential supervision, and in liquidity support (roles also considered by Healey (2001)), as well as factors related to whether CBs have financial stability mandates, how CBs view their role in financial stability, how CBs organise their financial stability function internally, and whether CBs publish FSRs (roles also considered by Osterloo and de Haan (2004)).<sup>4</sup> Additionally, Smaga (2013) also considers publication of an FSR and of stress test results as indicators of a CB's financial stability involvement. In contrast to Lim *et al* (2013) and Lombardi and Siklos (2016), Smaga's interest in measuring CB involvement in financial stability is not to assess how effectively countries utilise macroprudential policy tools or maintain financial stability, but rather is to consider whether countries joining the common currency area led to a refocusing of efforts and resources.

## 2.2 Determinants of governance structure

In a series of essays, Tucker (2014, 2016) considers the appropriate assignment of macroprudential authorities across agencies, particularly as they relate to time-varying policies. Tucker notes that – similar to monetary policy – the immediate risk of unpopularity that stems from activating time-varying macroprudential policies leads to the tendency for policymakers to delay action until financial system vulnerabilities are unquestionably evident, and thereby precariously high. This consideration, he notes, would argue for entrusting authority for time-varying policies with unelected officials.<sup>5</sup> That said, he notes that macroprudential policies both increase the resilience of the system to prevent future crises and – particularly for time-varying policies – correct credit cycles and misallocations of credit. Since the latter have important distributional consequences, such decisions should rest with elected, rather than unelected, officials. For example, he argues that debt service-to-income ratio and LVR caps should not be set by unelected officials, such as a prudential authority or CB, because of their significant distributional consequences. Unelected officials' authorities should instead be limited only to setting caps on the fractions of mortgages exceeding some ratio.

Bodenstein *et al* (2014) consider strategic interactions among different policymakers, with different tools when policymakers' objective functions include not only maximising household welfare but also achieving a policy variable target, and when each policy tool can affect other policymakers' objectives in addition to their own. In an example with a monetary policymaker whose objective function additionally includes stable inflation and a macroprudential policymaker whose objective function additionally includes maintaining sustainable levels of bank capital and lending, they show that substantial welfare gains can be obtained from coordination, relative to the outcome that is associated with the model's open-loop Nash equilibrium solution. Additionally, these authors find that adding to each policymakers' objective function some recognition of the other policymakers' additional objective would move the sub-optimal Nash equilibrium allocation notably closer to the

4 In Smaga's review of the literature, it appears that it is mainly in post-crisis papers – specifically the Ingves Report (BIS 2011) by the Central Bank Governance Group of the BIS and Vinals Report (IMF 2010) by the IMF – that the use of macroprudential policy tools and inter-agency coordination start to enter into consideration for CBs' involvement in financial stability.

5 The European Systemic Risk Board (ESRB) guidance to countries on their macroprudential policy framework emphasises that they should be shielded against outside pressures through independence; see ESRB (2012).

cooperative policy outcome. This result could be interpreted as suggesting benefits from either making both policies the responsibility of one policymaker or for a forum, such as an FSC, to facilitate coordination between members.

Masciandaro and Volpicella (2016) adopt a political economy perspective to explain the strength of the CB's role in the macroprudential policy infrastructure of 31 countries, as measured by Lim *et al's* (2013) MaPP index. They find that if the CB already has micro supervisory responsibilities for banks, it is more likely to have a stronger role, perhaps reflecting a desire to take advantage of informational advantages. They also find a stronger role for the CB if the CB has less political independence, which they speculate may represent attempts by governments not to give too much power to the CB. Moreover, they find some evidence that the CB tends to have a stronger role in macroprudential policy if it has a clear monetary policy mandate, such as a clear inflation target, consistent with governments attempting to limit the power and discretion of the CB. We consider some similar issues to Masciandaro and Volpicella (2016), although our analysis covers a larger number of economies with a greater representation of advanced economies. Additionally, Masciandaro and Volpicella do not explore factors that might explain the role of the MoF in the coordinating body, which is one of the issues that we explore below.

### 3. Characteristics of Governance Structures for Macroprudential Policy

We collect data on governance structures for a sample of 58 economies (listed in Appendix A). A brief outline of how we collected our data is provided in the first sub-section and a description of our findings is given in the second sub-section.

#### 3.1 Sample and data sources

Because we view an important future question to be the link between governance structures and the use of tools, specifically cyclical tools, we started with the sample of 64 economies in the macroprudential policy tool database of Cerutti *et al* (2016). We dropped from the database, however, six of the seven economies that Cerutti *et al* highlight as having limited information about the use of tools, although we did not drop Saudi Arabia because we wanted to include the full set of G20 economies in our dataset. We did, however, drop Taiwan because of lack of information about its governance structure. We also added Cyprus because it is the only EU country excluded from the Cerutti *et al* macroprudential tool database and we wanted to include the full set of EU countries. This process results in a sample of 58 economies, of which 28 are advanced economies and 30 are emerging market or developing economies, as categorised by Arnone and Romelli (2013), with this categorisation being consistent with the IMF's 2007 World Economic Outlook (WEO) reports.<sup>6</sup>

<sup>6</sup> More recent IMF WEOs have added seven additional countries to the listing of advanced economies. With the exception of the Czech Republic, the countries that have been added are those that have in recent years become members of the common currency euro area. (See the IMF's web page 'Changes to the Database: World Economic Outlook Database', available at <<https://www.imf.org/external/pubs/ft/weo/data/changes.htm>>, for a listing of these changes.) Given this reason for the change in classification, we do not use the more recent WEO definition. Moreover, we want the variable to represent the economy's status at the time countries were considering how to structure their new governance structures, and 2007 is right before the global financial crisis and when most new structures were beginning to be formed.

The main sources for our information on economies' financial stability governance structures, safety and soundness authority's responsibilities, and tool availability were national authorities' websites (and further documents referenced therein), national authorities' FSRs, IMF Article IV reports, and, where available, IMF FSAP reports. In addition, we undertook various crosschecks, including comparing what we inferred from our sources with Lombardi and Siklos (2016) for macroprudential policies, with Nier *et al* (2011) for microprudential policies, and with an appendix table on institutional structure in a recent IMF/FSB/BIS (2016) report.<sup>7</sup> For information on CB financial stability mandates, we also consulted Jeanneau (2014) and CGFS (2016b). For information about the availability of tools, we additionally consulted responses to the IMF's global macroprudential policy instrument survey for 2013. A large reason for our preference for national authority websites are the ongoing changes in financial stability governance structures, some of which have occurred as recently as 2015.

### 3.2 Financial stability committees

Our review of governance structures finds that 41 of the 58 economies have formal or de facto FSCs (Table 1). Of these 41 economies, 34 have an FSC formally created by legislation and 7 have a de facto FSC, which means that a committee exists and meets regularly but exists only as a result of non-legislative arrangements between the agencies, such as memorandums of understanding (MOUs). Of the 17 economies that do not have formal or de facto committees, we determine that 15 have assigned, at least in practice, macroprudential responsibilities to a single institution, and of these, 14 have the CB as the single authority (where in all cases the CB is also a PR)<sup>8</sup> and 1 economy has the PR as the sole institution.<sup>9</sup> Finland and Israel have informal arrangements, in which meetings take place between agencies, though they occur at the staff level and have not been formalised through any procedural documents.

In addition, a number of the 17 economies without an FSC have informal information sharing and coordination arrangements in place among agencies. For example, New Zealand has an arrangement in which there is a written MOU between the CB governor, who is responsible for macroprudential policy, and the minister for finance, which says that the governor must consult with the minister when macroprudential policy actions seem likely. In Singapore, where 'stamp duties' have been an important policy tool to address rapidly increasing home price valuations, informal consultative arrangements are in place between the CB and MoF.

7 While in the vast majority of cases our findings on institutional structure were the same as those of the sources against which we performed our crosschecks, there were instances in which we differed. Our approach in these instances was to recheck our sources and if we considered our assessment to be correct we proceeded with that.

8 The 14 economies for which the CB is the single authority are Argentina, Belgium, Cyprus, Czech Republic, Greece, Hungary, Ireland, Lithuania, New Zealand, Portugal, Saudi Arabia, Singapore, Slovak Republic and Thailand. Note that in the paper we denote the CB that is also a PR as a CB.

9 Of the 17 economies, 10 are EU members, which means that under the ESRB's recommendation on the macroprudential mandate of national authorities (ESRB 2012), they are required to explicitly designate a macroprudential authority. In 9 of these economies the CB is the designated authority, and in 1 economy – Finland – the PR is the designated authority. In the 7 non-EU economies, the extent to which the macroprudential authority is explicitly assigned to a particular government agency varies. If not explicitly stated, we judge the agency that is responsible for prudential regulation to be the macroprudential authority. In all but one case, Peru, this agency is the CB.



**Table 1: Macroprudential Governance Structures**

Type of governance structure		Year FSC formed		Chair or co-chair of FSC <sup>(a)</sup>		Members with voting rights on FSCs	
Type	No	Year	No	Type	No	No of agencies	No of FSCs
Formal FSC	34	≤ 2008	11	CB	18	2	6
De facto FSC	7	2009	1	CB is a PR	10	3	8
Single agency	15	2010	5	MoF <sup>(b)</sup>	25	4	17
CB	14	2011	3	PR	1	5	7
CB is a PR	14	2012	3	No chair	2	≥ 6	3
PR	1	2013	10				
Informal	2	2014	4				
		2015	4				
<b>Total</b>	<b>58</b>	<b>Total</b>	<b>41</b>			<b>Total</b>	<b>41</b>

Notes: (a) Sums to more than 41 because for 3 committees the CB and MoF are co-chairs, for 1 committee the CB and MoF (and the other FSC members, the market regulator and deposit guarantee fund) are rotating chairs, and for 1 committee the CB and PR are co-chairs

(b) Includes the First Deputy Prime Minister who chairs the FSC of the Russian Federation

Most of the 41 FSCs that are in existence today were created relatively recently and, specifically, after the global financial crisis. Only 11 FSCs were formed before 2008, and 30 were formed in 2009 and later. The most frequent year for formation is 2013, with 10 economies. Of these 10 economies, 7 were EU members, so it is possible that this large number of FSCs formed was tied to the ESRB's recommendations that were issued in 2012 (ESRB 2012). Indeed, of the 18 FSCs formed from 2013 onwards, 12 were from EU economies. The fact that such a large number of FSCs were formed quite recently indicates the importance of ongoing updates on progress.

For the 41 economies that have formal or de facto FSCs, we identify the chairs. We find that the CBs and MoFs are the most frequent chairs. The MoF is the chair or co-chair of 25 FSCs and the CB is the chair or co-chair of 18 FSCs. The MoF and CB co-chair 3 FSCs, and the PR and CB co-chair 1 FSC. In no economy is the PR the sole chair. In one economy – Romania – the chair of the FSC rotates between members and in two economies with a de facto FSC – Japan and the Philippines – there is no FSC chair.

In our analysis, we separately include each of the 19 countries in the euro area rather than treating the euro area as a single entity. There is considerable heterogeneity in governance structures across these countries, so this treatment does not bias the results. In particular, 11 of the euro members have a formal or de facto FSC, 1 has an informal committee, and 7 have designated the CB as the single authority. Moreover, for the 11 euro area FSCs, 7 have designated the MoF as the chair and 4 have designated the CB as chair. In general, the larger members, including France, Germany, Italy, and Spain, have an FSC with the MoF as chair.

Most (33 of 41) formal or de facto FSCs have three to five agencies as members with voting rights: 17 have four voting agencies, 9 have three voting agencies, and 8 have five voting agencies. Only 3 FSCs have members from more than five agencies and 5 FSCs have members from only two agencies. Note that we are reporting here the number of agencies represented and that vote, not the number of members of the committee, to represent the structure of the financial system. Many committees include more than one representative from any member agency and many committees include external members or experts on specific topics.

Policy committee structures were active areas of research in the monetary policy arena in the late 1990s and early 2000s following the significant changes in monetary policy formulation that occurred in the early 1990s. The literature considered several issues, including the degree of consensus that committees sought to achieve, the strength of the leadership of the committee chair, committee size, committee membership, and committee appointments. Researchers in this area – such as Blinder (2007, 2008) – noted that desirable committee size depends on a number of factors, including the range of expertise that was desired on the committee, the degree of consensus that was desired on committee decisions, and the size of the country, which determines the talent pool and the ability to staff the committee. Given this logic, it is not surprising that the most frequent committee size is four, with a typical representation being a CB, PR, market regulator, and MoF. In addition, a more complicated financial sector would likely call for a larger committee, while a higher desire for consensus among policymakers would likely call for a smaller committee. In our review, only three economies have FSCs with six or more members, and all FSCs with tools – with the exception of the United States – have five or fewer members, which seems a manageable number for coordination.

### 3.3 Authority for macroprudential tools

Few FSCs have what the IMF/FSB/BIS (2016) report and the IMF (2013) paper would consider as ‘hard’ or ‘semi-hard’ powers: hard powers give policymakers direct control over macroprudential tools or the ability to direct other regulatory authorities, and semi-hard powers enable policymakers to make formal recommendations to other regulatory authorities, coupled with a comply or explain requirement. Comply or explain requirements can be used to influence the wide range of regulatory actions that would ultimately be undertaken by other supervisory and regulatory agencies.

Only 11 of the 41 FSCs have semi-hard or hard powers (Table 2). France’s High Council for Financial Stability (HCSF) and the UK’s Financial Policy Committee (FPC) have hard powers over time-varying macroprudential tools.<sup>10</sup> Other than these two cases, most FSCs have only

<sup>10</sup> Some FSCs have hard powers to address structural vulnerabilities. The US Financial Stability Oversight Council (FSOC) can designate non-bank financial firms as systemically important. Such designation needs two-thirds majority support from the members of the FSOC and the Secretary of the Treasury must be part of this majority. Somewhat similarly, the UK FPC has the power to make recommendations to HM Treasury on the regulatory perimeter and on which activities should be regulated and whether an institution carrying out regulated activities should be designated for prudential regulation by the Prudential Regulation Authority rather than the Financial Conduct Authority and vice versa. Notably, however, this tool is not a time-varying tool in that it is not used to designate firms during credit expansions and de-designate during contractions with an intent to promote moderate credit growth.

semi-hard powers, which in all cases is the authority to make recommendations along with formal comply or explain authority. The remaining 30 FSCs have either only 'soft' powers, which enable policymakers to express an opinion, a warning or a recommendation but without any comply or explain requirements, or have only an information sharing function. Thus, it appears that most committees appear to function to promote information sharing and coordination, rather than to directly implement policies.

**Table 2: Authority for Tools**

FSC powers		Authority for countercyclical capital buffers (CCyB)		Authority for stress tests <sup>(a)</sup>		Authority to set LVRs	
Soft only	30	No	5	No	0	No	19
Semi-hard or hard	11	Yes	53	Yes	57	Yes	39
		If Yes:		If Yes:		If Yes:	
		FSC	2	FSC	0	FSC	1
		CB	31	CB	37	CB	22
		CB is a PR	30	CB is a PR	33	CB is a PR	21
		PR	16	PR	18	PR	7
		MoF <sup>(b)</sup>	4	Joint CB and PR	2	MoF <sup>(b)</sup>	9
				MoF	0		
Total	41						

Notes: (a) Unknown for South Korea

(b) Note that for Switzerland and Denmark the government (rather than the MoF) sets the CCyB and for Spain the government sets LVRs

The IMF (2013) views comply or explain powers as being well suited to situations where further judgement by the relevant agency is important. The IMF also views them as potentially well suited to situations where a policy action is expected to face considerable political pressure and where a comply or explain directive could both broaden support for the agencies' action as well as result in greater transparency for the decision. It also views comply or explain powers as being more practical for addressing the structural component of systemic risk, rather than the cyclical component, since they may be better suited to macroprudential policy interventions that are less frequent in nature. An example of this is the US FSOC recommendation to the market regulator in 2014 to eliminate the fixed net asset value in order to reduce the risk of investor runs in prime money market funds that were permitted to invest in instruments with credit risk. More recent experience, however, suggests that FSC comply or explain instructions can likely also be directed at cyclical risks. For example, in June 2014 the UK FPC made recommendations to microprudential authorities in relation to cyclical developments in owner-occupied mortgage lending. Likewise, in November 2016,

the ESRB issued comply or explain warnings on medium-term vulnerabilities in the residential real estate sector to the MoFs of eight EU member states (Austria, Belgium, Denmark, Finland, Luxembourg, the Netherlands, Sweden and the United Kingdom).<sup>11</sup>

Strong communication is recognised to be an important part of countries' macroprudential arrangements in order to promote public awareness of risks and understanding of the need for authorities to take mitigating actions (IMF 2013, 2014; CGFS 2016b). FSRs have for some time been used by CBs to present their analyses of financial stability issues. Čihák *et al* (2012) document the rapid growth in the number of CBs – from 1 to about 50 – issuing FSRs between 1996 and 2005, and the publication of FSRs by 44 countries over much of the period 2000–09. However, they find only modest evidence that better FSRs yielded better financial stability outcomes. Relatedly, Correa *et al* (2017) document that while the sentiment conveyed in FSRs correlates with the financial cycle – indicating that CBs communicate financial conditions and changes in financial conditions in FSRs quite accurately – FSR communications have little effect on the financial cycle. These outcomes suggest limited success of FSRs as a communication-based macroprudential policy tool. This outcome has been interpreted by some as indicating that information provision on its own is not sufficient to reduce the risk of sub-optimal non-cooperative Nash equilibriums (Bodenstein *et al* 2014).

Čihák *et al* (2012) also document that some FSCs have begun publishing FSRs, including the US FSOC that published its first FSR in 2011, and Mexico's Financial System Stability Council, which has also published reviews and assessments on financial stability. It is possible that FSC publication of FSRs could lead to better financial stability outcomes because the actual production process facilitates greater information sharing, cooperation, and the recognition of alternative objectives. Still, the finding that many FSCs do not have their own tools – comply or explain, or powers to direct actions – raises the risk that FSCs will lead to similar outcomes as FSRs; that is, gains in financial stability outcomes would be only modest. If each member agency already uses its own tools to achieve its own mandates, a first-best outcome based on the Tinbergen separation principle would be difficult to achieve if financial stability objectives were to conflict with existing mandates.

Since our review found that most FSCs have only soft tools, we looked further at which agencies had the authority to implement time-varying tools, specifically CCyBs, bank stress tests, and LVRs. Cerutti *et al* (2016) show that of the twelve macroprudential tools considered by Cerutti, Claessens and Laeven (2017), only five were used frequently, and the others were changed very infrequently over 2000 to 2013. Among the five tools that were used frequently, they document that LVRs and reserve requirements (for purposes other than monetary policy) are correlated with credit growth in a way that suggests that they have been used to reduce boom-bust credit cycles. The other three tools, general capital, concentration limits, and interconnections, have not been adjusted in a way consistent with countercyclical intentions. Their finding that capital is not used as a countercyclical tool reflects the fact that their

11 Heads of national macroprudential authorities also received copies of their country's warning. The ESRB's rationale for sending the warnings to MoFs was that the policies needed to respond to the risks may extend beyond the mandate of macroprudential authorities (ESRB 2016).

analysis captures the adoption of higher Basel III capital requirements, which is a structural adjustment, and does not include the new CCyB or the increasing use of bank stress tests.<sup>12</sup>

Overall, our tabulation suggests that while most economies have granted an agency the authority to implement CCyBs, stress tests, and LVR adjustments, the FSC almost never directly controls these tools. The CCyB as a new tool went into effect in 2016, is calibrated generally to system-wide rather than bank-specific risks and allows for cross-border reciprocity arrangements, so it seems plausible that economies could have established the authority at the new FSCs or it would involve the MoF (or government more broadly). On the other hand, the skills for calibrating CCyBs, which are based on time-varying system-wide financial vulnerabilities, would normally be at the CB and the tool would be applied to regulated banks. The vast majority, 53 economies, have established the authority to set the CCyB (Table 2). For the 53 economies, we found that only 2 have the FSC as setting the CCyB. The CB has the power in 31, the PR has it in 16 and the MoF (or government more generally) in 4, albeit most with a strong role for the CB in providing advice. While it appears that the CB is the most frequent authority, all but one of the CBs is also the PR. Only in Indonesia is the authority for the CCyB assigned to a CB that is not a PR, and here there is a somewhat specific situation in which the CB was the PR until only a few years ago.

Our findings for stress tests are similar. Stress tests are a relatively new tool but pre-date the formation of many of the FSCs, and are used by almost all economies. No doubt there is great variation in how they are implemented, from whether banks or supervisors estimate the losses to whether they are designed to support only microprudential objectives or also macroprudential objectives. In terms of which entity has the authority to implement them, the primary agency is the CB in 37 economies and the PR in 18 (Table 2). Among the 37 CBs, 33 are also PRs. In no economies is the FSC or MoF in charge, even less than in the case of CCyBs. Perhaps the limited role for FSCs for these two tools is because they are applied to banks, and PRs and CBs have inherent information and skill advantages.

In contrast, LVRs are borrower- rather than lender-based, suggesting political or other factors, such as home ownership goals, may be considerations and a more system-wide analysis is needed. We find that 39 economies have established the authority to set LVRs, less than for CCyBs and stress tests, although we recognise that economies may be able to establish a new authority if they were to want to use LVRs as a macroprudential tool (Table 2). Again, we find that FSCs do not direct this tool. The FSC has authority in 1 economy, while the CB has the authority for 22, the MoF has the authority for 9 economies, and the PR for 7. Of the time-varying macroprudential policy tools, LVRs have the most cases of the authority being assigned to the MoF. This outcome is consistent with the view – often articulated by Tucker (2014, 2016) – that policies like LVRs that have distributional consequences should not be directed by unelected officials in independent agencies.

<sup>12</sup> We assume the CB retains the authority for reserve requirements, even if an FSC exists, and as such do not include this tool in Table 2. (Recall that only two FSCs have hard tools – the UK's FPC and France's HCSF – and neither list reserve requirements as one of their policy tools.)

Although the authorities for these tools reside primarily with the traditional agencies, the creation of FSCs in which the traditional agencies participate as members should – per the findings of Bodenstein *et al* (2014) – lead to improved policy outcomes. For example, in economies where the PR has the authority for CCyBs, stress tests, or LVRs, they are members of the FSC in all but one or two economies, and in economies where the MoF (or the government) sets LVRs there exists an FSC in all but one. There is only one case where the government sets the CCyB where the MoF is not on the FSC (Switzerland), but in this case there is a clearly articulated process for consultations with the CB and PR. Thus, while we find that tools are not taken from existing regulators and granted to FSCs with a financial stability mandate, there may still be gains to financial stability because the FSC improves communications among the existing regulators.

To summarise our analysis of governance structures so far, the majority of economies in our dataset have established FSCs and most were created recently. CBs and MoFs are the most frequent chairs. The CB is the chair or co-chair of the FSC in 18 economies, and is the sole agency in another 14. The CB is part of the governance structure – either as an FSC member or as the sole agency – in all but 2 economies, Chile and Peru. This near-universal representation suggests that CBs play a special role. The MoF also has an important role and is chair or co-chair in 25 economies.

In addition, committees appear to be set up in many cases to encourage cooperation and coordination among existing regulators rather than to establish new separate entities with independent tools. Most FSCs have between three and five voting agencies, which usually include the primary PR, the CB, and the MoF, and appear to be small enough to successfully coordinate actions across the entities. But few committees have independent authority for comply or explain, or for time-varying tools. Although most economies have adopted the CCyB and stress tests, and many use LVRs, the authorities for these tools reside primarily with the CB or PR. But in most economies, these agencies are also members of FSCs, so there may be gains from information sharing, which could lead to better macroprudential policies.

#### 4. Rationale for the Special Role of the Central Bank

There is a commonly held view that CBs should be prominent in macroprudential policymaking (IMF 2011; ESRB 2012).<sup>13</sup> For example, the ESRB recommends “the national central banks should have a leading role in macro-prudential oversight because of their expertise and their existing responsibilities in the area of financial stability.” This conclusion is further strengthened when central banks are also in charge of micro-prudential supervision’ (ESRB 2012, p C 41/1).

We summarise the main reasons provided for granting the CB an important role in Table 3. Nier (2009) and Nier *et al* (2011) support a strong CB role because CBs have expertise in identifying and analysing systemic risks that is crucial to inform macroprudential policies aimed at reducing procyclical risks. In addition, a strong CB role enables use of the CB’s

<sup>13</sup> Earlier studies of financial stability policymaking capacity focused almost entirely on the CB rather than coordinating bodies (Smaga 2013).

existing experience in communicating risks to the markets and general public, and it would lead to greater coherence about risk warnings and messages. They cite drawbacks as well, including: lack of institutional mechanisms to challenge the risk assessment views formed within just one institution; the risks of managing too many functions within the CB; and concentration of too much power at the CB, which is run by unelected officials.

Tucker (2014, 2016) also discusses the principles by which macroprudential policy decision-making authorities should be assigned to CBs, PRs, and market regulatory authorities. With regard to CBs he notes that CBs both with and without PR responsibilities are reasonable candidates for having authority for time-varying macroprudential policies. As the liquidity reinsurer for the financial system, CBs are called to the scenes of financial disasters regardless of whether or not they have prudential authority. Moreover, their core purpose of maintaining stability in the monetary system overlaps with financial stability given that it is private institutions (mainly banks) that issue monetary liabilities. Additionally, the deliberations and processes for undertaking time-varying macroprudential policies are much more akin to monetary policy than they are to microprudential policies. The key considerations against strong CB authorities for time-varying macroprudential policies are that it may be granting the CB too much power, as well as assigning additional responsibilities to the CBs that take it too far away from their monetary functions.

Nier *et al* (2011) also provide some empirical evidence, albeit somewhat limited, that suggest a greater role for CBs tends to be associated with better outcomes. In particular, they cite that losses are lower in the event of failures when the CB is also a bank supervisor or there is a good coordinating mechanism. Nier *et al* look at three measures of the costs of banking crises – failed banking assets, capital injections, and guarantees – and find that the group of countries with close integration between the CB and banking supervisory agencies have lower average costs than those countries with separate arrangements. They cite an earlier study by Goodhart and Schoemaker (1995) as one of very few existing studies to examine the effect of the institutional structure on outcomes. That study found, based on a sample of 104 (large) bank failures that occurred across 24 countries in the 1980s and early 1990s, that there were significantly lower actual and expected bank failure rates in the 11 countries with an integrated regime than in the 13 countries with a non-integrated regime. Merrouche and Nier (2010) found that the build-up of financial imbalances (measured by the ratio of loans to deposits) depends on institutional structure, with a less severe build-up where the CB had full control of supervision and regulation.

However, Koetter, Roszbach and Spagnolo (2014) examine for 44 countries whether the CB being the PR affects the credit risk or non-performing loan ratio at banks, and finds no evidence of a relationship. Thus, the empirical evidence is mixed on benefits from the CB also having supervisory authorities. Nevertheless, these studies are somewhat limited in the sense that they focus only on the effects of greater CB interaction on the financial condition of the banks, rather than the entire financial system, and so do not reflect the more recent focus by regulators on system-wide risks or broader tools.

**Table 3: The Role of Central Banks for FSCs and Macroprudential Policymaking**

<b>Arguments in favour of a stronger role</b>
<i>Information synergies</i>
CB expertise from other responsibilities, including being the lender of last resort for financial firms, operating the payments system, and – for some CBs – being the PR (Nier 2009; Tucker 2014, 2016; Masciandaro and Volpicella 2016)
<i>Skill advantage in time-varying analysis</i>
CB has expertise in:
<ul style="list-style-type: none"> <li>• monitoring macroeconomic and financial conditions over time (i.e. filtering signal from noise)</li> <li>• analysing and assessing the broader systemic implications of identified vulnerabilities, derived from its monetary policy responsibilities</li> <li>• communicating potential risks that may require a policy response</li> </ul>
Required skills are more similar to monetary policy than to microprudential supervision (Nier 2009; Tucker 2014, 2016)
<i>Independence</i>
Independent authority and thus better able to set countercyclical policies that are unpopular (Tucker 2014, 2016)
<i>Consistency advantage</i>
Greater consistency and coherence in using a range of tools in a single entity (Nier 2009)
<b>Arguments in favour of a weaker role</b>
<i>Power</i>
CB is already an independent monetary authority, and would have too much power (Nier 2009; Tucker 2014, 2016; Masciandaro and Volpicella 2016)
<i>Responsibilities</i>
CB with many functions, given limited resources, will not perform all functions well, and the function that is most visible will receive the most attention (Nier 2009; Tucker 2014, 2016)
<i>Undermine monetary policy mandates</i>
A leadership role for financial stability could undermine its commitment to monetary policy objectives, which could lead to higher inflation (Ueda and Valencia 2012; Tucker 2014, 2016; Masciandaro and Volpicella 2016)
Could threaten monetary policy independence if it leads to additional government scrutiny (Tucker 2014, 2016) or if crises result and the CB loses credibility (Smets 2014)
<i>Inappropriate</i>
Would inappropriately give unelected officials authority for policies with distributional effects (Nier 2009; Tucker 2014, 2016)



Lim *et al* (2013) examine if the institutional arrangements can explain response times for the use of tools to moderate credit growth. For example, for one measure of response time, they identify a break in the trend of credit and then measure how long it takes to implement one of eight macroprudential tools. For their sample of 39 countries, from 2008 to 2011, they find a negative correlation between policy response time and the involvement of the CB, suggesting that including the CB is conducive to reducing policy response time. Their results support the IMF's position that the CB needs to play an important role, reflecting its unique position to monitor macrofinancial linkages, identify systemic risks, and its experience in communicating risk to markets and the general public. They do not find a similar link to the strength of the MoF in the macroprudential set-up.

CBs face a unique situation as part of a macroprudential policy committee. CBs also set monetary policy, and even if they do not have financial stability as a mandate, they may not be able to ignore the potential effects of monetary policy because it can affect the build-up of vulnerabilities through a risk-taking channel. Ueda and Valencia (2012) consider how time inconsistency and political pressures can distort the incentives of a monetary authority that makes simultaneous monetary policy and macroprudential decisions. Smets (2014) presents a simplified, static version of this model in which policymakers minimise a quadratic loss function for inflation and output variability, augmented with a loss term for leverage variability (where this function can be obtained from a second-order approximation to the social welfare function in a model with nominal rigidities and agency costs in credit markets). Additionally, economic activity and leverage in this model are affected by the macroprudential policy instrument, and the economy's full employment level of output is below that of its efficient level (a standard assumption in the Barro-Gordon literature), while leverage is above its optimal level (due, for example, to fire sale externalities).

When the CB can credibly set inflation expectations, and monetary policy has price stability as its sole objective, policy will be set to achieve the optimal level of inflation, and macroprudential policy also delivers the optimal level of output and leverage, knowing that if it is lax and allows debt to become excessive, monetary policy will not inflate away the debt by delivering higher inflation. But if monetary policy also has financial stability as an objective, it will have an incentive to inflate away debt. Knowing this, macroprudential policy will be lax, which will mean higher output, but also higher optimal debt and an upward inflation bias. Smets (2014) notes that these time-inconsistency risks can be mitigated if the objectives, instruments, communications, and accountability for price stability and financial stability are separate, albeit with information sharing between the two bodies, leading to the view that this type of structure is beneficial. An additional reason that Smets notes to keep macroprudential policy separate from monetary policy is that, since monetary policy cannot fully prevent crises, the actual occurrence of a crisis could compromise the credibility and, in turn, independence, of the CB.

## 5. Empirical Analysis of FSC Structures

### 5.1 Variable definitions

It is not surprising that FSC structures differ, given they are starting from regulatory structures already in place, but there are some commonalities in terms of having representation from all the different regulators and having a prominent role for the CB. As noted, the chairs of the committee are primarily either the CB or the MoF. Chairs are especially important members of the committees because they set the agenda, and even if only for an information sharing committee, they may be held relatively more accountable for the committee's actions.<sup>14</sup>

As highlighted in Table 3, the advantages of having the CB as chair include: an information advantage because of its other functions (most notably, for some CBs, being the prudential supervisor); a skill advantage because of its focus on time-varying analysis, which is typical for its monetary policy duties; and its independence from the government, which may allow it to impose unpopular but necessary policies.

Offsetting these advantages, there could be concerns of: excessive concentration of power without accountability in the CB; too many responsibilities; reduced commitment to price stability; or some risk to losing its credibility or independence in the future, which could jeopardise price stability. If these concerns were high, countries might want to make the MoF or other entity the chair, or create a strong FSC with its own tools.

To test if there are observable factors that can explain the choice of chairs, we start by defining several variables, which are summarised in Table 4.

**Table 4: Strength of Central Banks and Ministry of Finance**

<i>Strong_CB_in_FS</i>		<i>Strong_MoF_in_FS</i>		<i>CB_is_a_PR</i>	
= 1 (CB not on FSC or not single agency)	2	= 1 (MoF not on FSC or not single agency)	22	= 0 (CB not a PR)	23
= 2 (CB on FSC and not chair)	24	= 2 (MoF on FSC and not chair)	11	= 1 (CB is a PR for banks only)	18
= 3 (CB on FSC and chair or co-chair)	18	= 3 (MoF on FSC and chair or co-chair)	25	= 2 (CB is a PR for banks and some non-banks)	10
= 4 (CB is single agency)	14	= 4 (MoF is single agency)	0	= 3 (CB is a PR for the entire financial system)	7

<sup>14</sup> Clearly, the role of the chair may differ across FSCs but at this stage we do not attempt to evaluate these possible differences. The issue of chair dominance has been studied in the context of monetary policy committees; see Blinder (2007, 2008).

The first variable we construct is ‘Strong CB in financial stability’ (*Strong\_CB\_in\_FS*) and we assign a value to it for each economy according to the following definitions:

- *Strong\_CB\_in\_FS* = 1, if an FSC exists but the CB is not a member of the FSC or if an FSC does not exist, another agency is the economy’s macroprudential authority;
- *Strong\_CB\_in\_FS* = 2, if an FSC exists and the CB is a member but is not the chair of the FSC;
- *Strong\_CB\_in\_FS* = 3, if an FSC exists and the CB is the chair or co-chair of the FSC; and,
- *Strong\_CB\_in\_FS* = 4, if an FSC does not exist but the CB is the economy’s macroprudential authority either in effect or by designation.

The second variable we construct is ‘Strong MoF in financial stability’ (*Strong\_MoF\_in\_FS*) and we assign a value to it for each economy according to the following definitions:

- *Strong\_MoF\_in\_FS* = 1, if an FSC exists but the MoF is not a member of the FSC or if an FSC does not exist, another agency is the economy’s macroprudential authority;
- *Strong\_MoF\_in\_FS* = 2, if an FSC exists and the MoF is a member but is not the chair of the FSC;
- *Strong\_MoF\_in\_FS* = 3, if an FSC exists and the MoF is the chair or co-chair of the FSC; and,
- *Strong\_MoF\_in\_FS* = 4, if an FSC does not exist but the MoF is the economy’s macroprudential authority either in effect or by designation.

Our *Strong\_CB\_in\_FS* and *Strong\_MoF\_in\_FS* are conceptually similar to variables that Lim *et al* (2013) construct, and that are used subsequently in Masciandaro and Volpicella (2016). As shown in Table 4 (and discussed above in Section 3), the CB is the chair or co-chair in 18 economies, and is the single agency for an additional 14. The MoF is chair or co-chair in 25 economies, and is never the single agency. Relative to Lim *et al* (2013), we show CBs have a stronger role in financial stability governance. In Lim *et al*, CBs are either the chair or single agency for 31 per cent of their sample, while we show a higher percentage of 52 per cent. A reason for this higher share is that there are now more coordinating committees than in Lim *et al*’s (2013) 2010 sample. In addition, we show that MoFs also have a somewhat stronger presence, and are the chair 43 per cent of the time, rather than the 31 per cent found in Lim *et al*. Interestingly, even if the MoF is not a member of the FSC, it is singled out to be an observer in five economies.

We also construct a variable describing the strength of the CB as a PR, which we use to test for a CB’s information advantage about the financial sector. The variable *CB\_is\_a\_PR* is defined as:

- *CB\_is\_a\_PR* = 0, if the CB is not a PR;
- *CB\_is\_a\_PR* = 1, if the CB is a PR and regulates only banks;
- *CB\_is\_a\_PR* = 2, if the CB is a PR and regulates banks and some non-banks; and,
- *CB\_is\_a\_PR* = 3, if the CB is a PR and regulates all of the regulated parts of the financial system.

As shown, CBs are not the PR in 23 economies, but they are in 35 (Table 4). In these 35 economies, they only regulate banks in 18 economies, while in 17, they regulate more than just the banking system. This is an important variable in our analysis, and below we divide it into two variables: *CB\_is\_a\_PR indicator*, which is equal to one if *CB\_is\_a\_PR* is greater than or equal to one, and zero otherwise; and *CB\_as\_wide\_PR*, which is equal to one if *CB\_is\_a\_PR* is greater than or equal to two, and zero otherwise. If a CB is also a PR, then it not only is an independent agency, but it has a substantial information advantage over other regulators and the government about potential risks to financial stability arising via the banking system. If an economy wants to take advantage of this type of informational synergy, we would expect that the strength of the CB in financial stability would be positively related to whether the CB is also a PR. In contrast, if the strength of the MoF were positively related, it might reflect that an economy sets up arrangements to prevent too much power or responsibility for financial stability in the CB. We investigate these issues with a set of regressions, described below, aimed at understanding our variables *Strong\_CB\_in\_FS* and *Strong\_MoF\_in\_FS*.

## 5.2 Baseline regressions

We run three logit regressions to assess what factors determine the choice to grant the CB a strong role in financial stability policymaking. The basic structure is similar to Masciandaro and Volpicella (2016), but we use a larger and more updated sample, separate the cases of CB as chair of the FSC and as a single agency, and examine determinants of having the MoF as the chair in order to help interpret the CB results. We also assume, as they do, that the microprudential regulatory structure is largely fixed when economies set up their financial stability governance structures.<sup>15</sup>

The regressions take the form:

$$\Pr(\mathbf{Y}_i = 1 | \mathbf{X}_i = x_i) = \frac{\exp(x_i' \beta)}{1 + \exp(x_i' \beta)}$$

where  $\mathbf{X}_i$  is a vector of explanatory variables, discussed below. The vector  $\mathbf{Y}_i$  is an indicator variable, which differs between the three regressions:

- in regression 1, it takes on the value one if *Strong\_CB\_in\_FS* = 3, and zero if *Strong\_CB\_in\_FS* = 1 or 2;
- in regression 2, it takes on the value one if *Strong\_CB\_in\_FS* = 4, and zero if *Strong\_CB\_in\_FS* = 1 or 2;

<sup>15</sup> Although outside the scope of our study, our review of economies' FSCs uncovered only a few instances of economies reorganising their microprudential regulatory structures. Hungary and Belgium had created FSCs but later changed to a single macroprudential authority after moving the PR into the CB. Hungary, in 2010, following the financial crisis, created an FSC with three members, the CB, PR, and MoF, but in 2013 merged the PR into the CB, and made the CB the single authority. Belgium, in 2002 in the aftermath of the 11 September terrorist attacks, created a business continuity-oriented FSC consisting of the CB and PR (also a markets regulator). In 2010, it moved the prudential regulation of financial institutions into the CB, created a separate markets regulator, and made the CB the single authority for financial stability. In contrast, Indonesia moved the PR out of the CB into a separate newly created PR authority.

- in regression 3, it takes on the value one if *Strong\_MoF\_in\_FS* = 3, and zero if *Strong\_MoF\_in\_FS* = 1 or 2.

We treat CB as chair or co-chair of a committee (*Strong\_CB\_in\_FS* = 3) separate from CB as the single agency (*Strong\_CB\_in\_FS* = 4). Unlike in Lim *et al* (2013) and Masciandaro and Volpicella (2016), we do not assume that a single agency represents a stronger CB than when the CB is the chair of an FSC. Our reason is that their formulation combines two decisions – to create a committee and to designate a chair – rather than a simple ranking that the CB is a stronger presence in financial stability when it is a single agency than when it is a chair of a committee. We run these two cases separately and show they empirically depend on different economy characteristics.

- The main explanatory variables are the indicator variables, *CB\_is\_a\_PR indicator* and *CB\_as\_wide\_PR*, as well a number of other variables described below and summarised in Table 5. The baseline estimation results for regressions 1 to 3 are shown in Tables 6 and 7. All the variables, except the number of voting agencies, are measured in 2007, just before the recent financial crisis and before most of the FSCs were created. As such, they represent information available to country authorities when establishing the FSC structures.
- The credit-to-GDP ratio, denoted *Credit-to-GDP*: this variable may affect the governance structure since credit intensity may amplify output variability and, thus, affect the need for time-varying macroprudential policy and the skills of a CB. It may also reflect a more advanced financial system and financial deepening, and affect the need for coordination.
- The current account-to-GDP ratio, denoted *Current\_Acct-to-GDP*: this variable may affect governance structure since an economy with large gross capital flows may be more vulnerable to exchange rate variability and could therefore have greater need for time-varying macroprudential policy and the skills of a CB.
- The fiscal cost of the most recent financial crisis, denoted *Fiscal\_Cost-to-GDP*: this is from Laeven and Valencia (2012), who document significant fiscal outlays associated with banking crises, averaging 6.8 per cent of GDP during 1970–2011. These costs may affect governance structures since economies may want more active participation of the MoF or other parts of the government when the costs of crises are high, in order to coordinate macroprudential policies with other macroeconomic policies.
- *Advanced\_Economy* or not (according to the IMF WEO classification): advanced economies may have more complex financial systems because there may be more types of firms, markets and regulatory agencies. Macroprudential policymaking in these economies would require more coordination. Economies concerned about concentration of power may not give the CB more authority.
- The number of voting agencies (not members) on the committee, denoted as *#\_of\_FSC\_Voting\_Agencies*: the greater the number, the higher the need for coordination. As with advanced economies, concern over concentration of power may lead to an economy not granting the CB more authority.

- The political independence of the central bank, denoted as *CB\_Independence*, measured by the Grilli, Masciandaro and Tabellini (1991) index. Political independence is based on the involvement of the government in appointing the central bank governor or as a participant for formulating monetary policy.<sup>16</sup> This may affect governance structures since the more independent the CB, the more able it is to implement policies that might be unpopular.
- The size of the economy, measured by US dollar-denominated GDP and denoted *GDP*. This variable may affect governance structures since larger economies have more resources to staff different agencies.

**Table 5: Sample Characteristics of Selected Explanatory Variables**

Variable	No of obs	Mean	Standard deviation	10th percentile	90th percentile
<i>Credit-to-GDP</i>	58	91.8	53.7	29.5	171.9
<i>Current_Acct-to-GDP</i>	58	-1.1	9.8	-14.0	10.8
<i>Log(Fiscal_Cost-to-GDP)</i>	55	1.7	1.3	0.0	3.5
<i>Advanced_Economy</i>	58	0.5	0.5	0.0	1.0
<i>#_of_FSC_Voting_Agencies</i>	41	4.0	1.4	2.0	5.0
<i>CB_Independence</i>	58	0.6	0.3	0.3	1.0
<i>Log(GDP)</i>	58	26.4	1.5	24.4	28.6

Looking first at the results for CB as FSC chair (regression 1), as shown in Table 6, the coefficients on *CB\_is\_a\_PR indicator* and *CB\_as\_wide\_PR* are not significant in various specifications (shown in columns (A) to (C)), suggesting that economies do not see the information advantages the CB gains by also being the PR as important when deciding whether or not to make the CB the chair. This result is in contrast to Masciandaro and Volpicello (2016), an issue we will discuss further below. The coefficient on *Credit-to-GDP* is positive and significant, indicating CBs are more likely to be the chair when credit intensity is higher and so may be a more significant factor for macroeconomic performance, suggesting economies value the macroeconomic skill advantage of CBs.<sup>17</sup> However, the coefficient on *Current\_Acct-to-GDP*, also meant to capture the need for the macroeconomic skills of CBs, is not significant. The coefficient on *Advanced\_Economy* is negative and significant, indicating the CB is less likely to be the chair in advanced economies, perhaps because of concerns of granting additional powers to a CB in a more complex financial system, and perhaps because its information advantage over other regulators is smaller. The coefficient on *#\_of\_FSC\_Voting\_Agencies* is negative, though not significant, consistent with this interpretation.

<sup>16</sup> Masciandaro and Volpicella (2016) distinguish between political independence and operational independence. Operational independence is based on linkages between the CB and government in terms of credit provision by the CB to the government, and also if the CB is a PR. Because of this last criteria, we do not include operational independence.

<sup>17</sup> We also included the percentage change in the credit-to-GDP ratio from 2007 to 2014, and the coefficient is positive but generally not significant. This variable is meant to approximate the variability of the credit-to-GDP ratio, where higher variability would lead to greater demand for CB macroeconomic analytical skills. We plan to include the standard deviation of the credit-to-GDP ratio in the next version.

**Table 6: Logit Estimation Results for Central Bank as Chair of FSC or as Single Agency**

	Regression 1: CB as FSC chair Sample of FSCs			Regression 2: CB as single agency Sample for <i>CB_is_a_PR</i>	
	(A)	(B)	(C)	(D)	(E)
	<i>CB_is_a_PR indicator</i>	-0.33	-0.71	-0.23	
<i>CB_as_wide_PR</i>		0.88			1.51*
<i>Credit-to-GDP</i>	0.02**	0.02**	0.02*	-0.01	-0.01
<i>Current_Acct-to-GDP</i>			0.02		
<i>Advanced_Economy</i>	-2.87**	-2.99**	-3.16**	1.77	1.98
<i>#_of_FSC_Voting_Agencies</i>			-0.39		
<i>CB_Independence</i>	1.32	1.24	1.24	0.73	0.90
<i>Log(GDP)</i>	0.03	0.09	0.06	-0.62*	-0.75**
Constant	-0.94	0.66	-1.68	15.30*	17.80**
No of obs	41	41	41	35	35
Pseudo <i>R</i> -squared	0.14	0.15	0.18	0.12	0.20

Note: \*, \*\* and \*\*\* denote statistical significance at the 10, 5 and 1 per cent level, respectively

In terms of the magnitude of the effects implied by these coefficient estimates, whether or not the economy is advanced is the most important determinant.<sup>18</sup> If the economy is an advanced economy, the probability of the CB being the FSC chair is around 50 to 60 percentage points lower, relative to what it would have been had the economy been an emerging market or developing economy. The magnitude depends on the values of *CB\_is\_a\_PR indicator* and *CB\_as\_wide\_PR*. The marginal effect of the credit-to-GDP ratio on the probability of the CB being the FSC chair is relatively small. Specifically, a one standard deviation increase in the credit-to-GDP ratio from its mean across economies – which represents an increase from 97 per cent to 150 per cent – raises the probability of the CB being the FSC chair in an advanced economy by about 3 percentage points from around 14 per cent (estimates vary slightly depending on the settings of the values of *CB\_is\_a\_PR indicator* and *CB\_as\_wide\_PR*). For an emerging market or developing economy, where the implied probability of the CB as FSC chair is much higher, 75 per cent, a one standard deviation increase in the credit-to-GDP ratio implies an increase in the probability of 5 percentage points.

We estimate regression 2 for CB as the single agency (*Strong\_CB\_in\_FS* = 4) separately because the decision over leadership also involves an additional decision of whether or not to set up a committee. Also, CB as single agency may or may not represent a stronger CB role than CB as chair, depending on what arrangements it may have to coordinate with

<sup>18</sup> Note that, as is standard practice, all of the marginal effects that we report in this section are calculated setting all the continuous variables to their mean values.

other financial regulators and the government. Because all 14 CBs that are the single agency in charge of macroprudential policy are also PRs, we can estimate this regression only for the sub-sample of 34 economies for which the CB is a PR. The results for what determines the CB as the single agency authority, shown in columns (D) and (E), differ markedly from results for CB as the chair for an FSC (*Strong\_CB\_in\_FS* = 3), shown in columns (A) to (C). We find that in economies in which CBs are PRs for more than just banks (that is, *CB\_as\_wide\_PR* = 1) it is more likely that the CB will be the single agency in charge of macroprudential policy. This result suggests these economies are taking advantage of information synergies if they did not set up a committee. Moreover, the effects are economically sizable. For example, the CB being the regulator of more than just banks boosts the probability of the CB being the single agency in advanced economies from 17 per cent to 69 per cent, while for emerging market and developing economies it boosts the probability from 4 per cent to 34 per cent. The other significant variable is size (measured by *GDP*). The CB is more likely to be the single agency in smaller economies, suggesting that this choice could reflect resource constraints in smaller economies. Nevertheless, the magnitude of the effect is small. We also include the other variables in the CB chair regressions, such as the advanced economy indicator and the credit-to-GDP ratio, and they are not significant.

These two sets of results confirm that the determinants of having a single CB authority and having the CB as the chair of an FSC are very different. Masciandaro and Volpicella (2016) interpreted a positive coefficient on *CB\_is\_a\_PR* as countries giving central banks a stronger role in financial stability governance if they also were a PR. In contrast, our results show that for the 41 economies that create a committee, whether or not the CB is the chair does not depend on whether it is also a PR, suggesting potential benefits from information advantages are not a significant determinant of leadership. It is only for the 17 economies where no committee is created that the likelihood of the CB as the lead macroprudential authority is related to whether it is also a PR. Thus, our results suggest a more nuanced interpretation and do not support greater information advantage as the primary determinant for the prominent role of the CB in financial stability governance.

We turn next to the determinants for MoF as chair of the FSC (Table 7). Results for regression 3 show that an MoF being chair is less likely when the credit-to-GDP ratio is high and is more likely in advanced economies. Committees with more voting agencies are also more likely to have the MoF as chair (column (D)), though this result appears to mostly reflect that if the MoF is on the committee, there are more voting agencies. Similar to the CB as chair regressions, the most economically significant factor is whether the economy is advanced or not. The probability of the MoF being the FSC chair is about 40 percentage points higher for advanced economies, where the precise increase varies depending on the values of *CB\_is\_a\_PR* indicator and *CB\_as\_wide\_PR*. Thus, the results for CB as chair and MoF as chair combined suggest that while there is some support for economies designating the CB as chair because of its analytical skills, the most significant determinant is whether the economy is an advanced economy. One interpretation of this result is that these economies have more complex financial systems with more types of firms, markets and regulatory agencies,



and that there may be concerns about giving CBs additional power over such a broad and complex system as it could lead to an undue concentration of power. As such, these economies prefer to designate the MoF as chair of the FSC.

**Table 7: Logit Estimation Results for Ministry of Finance as Chair of FSC**

	Regression 3: MoF as Chair of FSC Sample of FSCs			
	(A)	(B)	(C)	(D)
<i>CB_is_a_PR indicator</i>	-0.79	-0.63	-0.24	-1.24
<i>CB_as_wide_PR</i>			-1.51	
<i>Credit-to-GDP</i>	-0.02*	-0.02*	-0.02	-0.02
<i>Current_Acct-to-GDP</i>				-0.03
<i>Log(Fiscal_Cost-to-GDP)</i>		0.55		
<i>Advanced_Economy</i>	2.20*	3.50**	2.26*	3.18*
<i>#_of_FSC_Voting_Agencies</i>				1.05**
<i>CB_Independence</i>	0.27	0.30	0.58	1.34
<i>Log(GDP)</i>	-0.02	-0.20	0.08	-0.33
Constant	1.61	5.29	1.16	4.64
No of obs	41	40	41	41
Pseudo R-squared	0.13	0.19	0.17	0.30

Note: \*, \*\* and \*\*\* denote statistical significance at the 10, 5 and 1 per cent level, respectively

For both the CB and MoF as chair regressions, we also included measures of CB political independence, but did not find them to be significant determinants for either choice. Masciandaro and Volpicella (2016) found a significant negative coefficient on political independence based on a sample of 31 countries, which they interpret as countries not wanting to give CBs additional macroprudential powers if they were already an independent agency, for fear of creating an all-powerful bureaucracy. We explored another measure of CB independence, specifically the measure developed by Cukierman, Webb and Neyapti (1992) and updated to 2010 recently by Bodea and Hicks (2015), but did not find a relationship with this measure either. We plan to explore this issue further. It is possible that there is a countervailing force in some economies, to grant more leadership to a CB when it is independent because it is more willing to take away the punchbowl, which offsets concerns about placing too much power in the CB.

We also tested the sensitivity of the results to whether the economy is part of the euro area. We included a dummy variable for an economy being in the euro area, but it was not significant. We also excluded economies in the euro area when we ran the regressions, but the results were not significantly changed. As noted above, countries that are members of

the euro area have not adopted a single common governance structure, although all are members of the ESRB.

Overall, our preliminary regression results for the strength of the CB role differ from Masciandro and Volpicella (2016), which may reflect our more recent and larger sample with more advanced economies, since CBs have stronger roles in smaller economies and emerging market and developing economies. We do not find support for the hypothesis that economies could try to take advantage of information synergies from CBs also being a PR when choosing which institution should chair an FSC. Nor do we find that more political independence of the CB leads to a stronger role for the CB in setting macroprudential policies. Instead, our results overall provide some evidence for the CB as being more likely to be the chair of an FSC in emerging market and developing economies, and in economies with high credit, perhaps a proxy for macro-based skill advantages related to developing monetary policy. The MoF is the chair or co-chair in 25 of 41 of the FSCs, and this is more likely in advanced and more complicated financial systems, perhaps because they require more coordination among many agencies, which may be a role better suited for government than a CB.

## 6. Summary and Conclusions

Using a newly constructed dataset of governance structures for macroprudential policies for financial stability, we find that nearly all of the 58 economies in our sample have a formal or de facto FSC as of 2016 or have placed that responsibility with the CB. Most FSCs were created after the recent global financial crisis.

In terms of leadership, the CB is the chair or co-chair in 18 economies and the sole agency in 14. It has authority to implement various time-varying macroprudential tools in more economies than the PRs and FSCs. However, the MoF is also an important member of FSCs, and is the chair or co-chair in 25 economies. Unlike the CB, however, it is never the sole agency. PRs are on nearly all of the committees and have the authority for tools in many economies. But they are the co-chair in only 1 economy, indicating that PRs are important in the institutional set-ups for financial stability, but they are not in charge of macroprudential policies. Representation of securities regulators is similar to PRs, with representation on most committees but they are never the chair.

FSCs appear to function in most economies as information sharing bodies to promote cooperation, and are not independent agencies with new tools. Indeed only 11 committees have hard or semi-hard tools and, in most cases, the tool is a comply or explain authority. Instead, the authorities for CCyBs, stress tests and setting LVRs rest with the existing regulators. This structure suggests that committees could not direct, but would need to convince the members to use their tools to mitigate identified financial stability risks. This set-up may simply reflect the political realities of trying to create a new governance structure for macroprudential policy without overly disrupting the existing system for microprudential policy and a cautious approach on the part of economies given uncertainty about how to calibrate macroprudential policies and their effectiveness. A recent CGFS paper (CGFS 2016a) highlights the importance of promoting wider cooperation in conducting appraisals of how macroprudential tools can

affect the financial system and economy. The skills required for these appraisals are unlikely to exist within one entity and rely heavily on expert judgement given the nascent science, and policy effectiveness may depend on the setting of other policies.

We also investigated what factors might explain the role assigned to CBs in financial stability governance. Preliminary regression results suggest that for economies that set up a committee, emerging market and developing economies are more likely to make the CB the chair, while advanced economies assign the role to the MoF. The likelihood of having the CB as chair is also positively related to the economy's credit-to-GDP ratio, but surprisingly it is not related to whether the CB is a PR. We plan to investigate these preliminary findings further, especially those related to political economy decisions for establishing FSCs in advanced economies and the roles assigned to CBs that are more politically independent.

Overall, these governance characteristics suggest that the new structures are most likely to promote financial stability through information sharing and coordination. The near-universal participation of CBs in arrangements may also be helpful. However, because most FSCs do not have independent powers, and existing regulators may have other mandates, the structures may be prone to inaction. As experience is gained – and, possibly, as economies experience situations in which financial system vulnerabilities are detected by an FSC but policy responses are unavailable – economies may adjust their committees. In the meantime, given that many committees are coordinating bodies of the relevant prudential agencies, they represent an additional regulatory layer. In this regard, economies should clarify the role of FSCs to avoid overlap and conflicts with existing agencies to be most effective. In addition, to reduce a tendency to inaction, they could take a number of steps other than to grant independent tools (such as comply or explain powers) to the committees. One would be for FSCs to ask the CB or PRs that currently have the powers to set the CCyB, LVRs and stress tests, to articulate frameworks ahead of time for the conditions that would prompt them to use the tools for macroprudential purposes. Another would be to create automatic mechanisms for FSCs to request tools from the government when needed, as in the United Kingdom, rather than to just issue a warning about a potential risk.

In terms of other avenues for further research over time, it will be important to monitor whether differences in governance structures actually affect the use of tools. For example, it might be useful to evaluate whether a stronger CB role would make it more likely for economies to implement time-varying macroprudential tools or whether it makes implementation more timely. Given the recent formation dates for many FSCs, however, there has not yet been enough experience with the use of tools, but we expect that governance measures like those developed in this paper will be useful for such analysis in the future.

## Appendix A: Sample Economies

**Table A1: Economies Considered**

Argentina	Finland	Luxembourg	Singapore
Australia	France	Malaysia	Slovak Republic
Austria	Germany	Malta	Slovenia
Belgium	Greece	Mexico	South Africa
Brazil	Hong Kong	Netherlands	South Korea
Bulgaria	Hungary	New Zealand	Spain
Canada	Iceland	Norway	Sweden
Chile	India	Peru	Switzerland
China	Indonesia	Philippines	Thailand
Colombia	Ireland	Poland	Turkey
Croatia	Israel	Portugal	Ukraine
Cyprus	Italy	Romania	United Kingdom
Czech Republic	Japan	Russian Federation	United States
Denmark	Latvia	Saudi Arabia	
Estonia	Lithuania	Serbia	

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