

New Financial Stability Governance Structures and Central Banks*

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This paper presents new data on governance structures to implement macroprudential policies to promote financial stability in 58 countries. We examine these structures' leadership, membership, and tools. We document that 41 countries currently have a multi-agency financial stability committee, but only two committees can direct countercyclical policy actions and only 11 can issue "comply or explain" directives to member agencies. The ministry of finance is much more likely to be the chair of a committee than the central bank. Central banks are the single macroprudential authority in another 14 countries. Regression results suggest that financial stability committees are designed to facilitate information sharing and coordination across agencies and that committee structures do not appear to be building on the skills of a central bank either as a prudential regulator or as the authority for monetary policy. We conclude that most committees are not set up to lead the formulation of countercyclical macroprudential policies and, as such, are not positioned to provide meaningful alternative policy options to monetary policy to address financial stability concerns.

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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, as well as creating or enhancing frameworks for macroprudential policies directed at system-wide or macro-level risks. Such macroprudential frameworks were laid out in some previous discussion documents (see, for example, the IMF, 2011, CGFS, 2010, and Bank of England, 2009). These documents emphasize that the ultimate objective of macroprudential policy is the stability of the financial system as a whole and across all likely macroeconomic and credit market backdrops. The documents describe three components of macroprudential policy frameworks, specifically: (1) measuring and monitoring systemic risk; (2) implementing policies to mitigate identified systemic risks; and, (3) establishing an institutional and governance structure for implementing policy.

This paper presents new information on progress on the third component of a macroprudential policy framework – institutional and governance structures. We review public official documents for 58 countries to evaluate the governance structures' leadership, membership, and tools. We examine membership and which agency – the central bank, ministry of finance, or prudential regulator – is the lead authority. Membership and leadership are of interest because agencies already have their own mandates and tools which may affect their approach to macroprudential policies.

We are particularly interested in a country's capacity to implement macroprudential policies to reduce time-varying or cyclical systemic risks. Macroprudential policies involve the dynamic adjustment of the parameters of regulatory policies, and – combined with static structural requirements that are calibrated to system rather than individual firm vulnerabilities – are the primary policies to promote financial stability. Time-varying policies recognize that strong structural requirements are not designed to offset pro-cyclicality in lending and borrowing, which can make an economy more vulnerable to adverse shocks. For example, risk management practices can lead financial firms to take on higher leverage when asset prices have been rising and volatility falling, leaving economies vulnerable to a rapid unwinding when asset prices fall. Adjustments of policies to offset dynamic leverage would require consideration of both firm-specific and macro-based risks, suggesting that governance will involve multiple agencies with different mandates and skill sets.

Indeed, recognizing these differences in mandates and skills among agencies, several international organizations, such as the IMF and FSB, recommend that central banks should be assigned a strong role in financial stability governance structures. They view that central bank

involvement will lead to greater consideration of macroprudential factors as a result of the macroeconomic skills and political independence that central banks have stemming from their monetary policy and lender of last resort functions. In contrast, they view bank regulators as more focused on microprudential issues, securities regulators on investor protection, and the ministry of finance with other social objectives that would make them less willing to slow expansions, a tension with central banks that is well-recognized in monetary policy setting frameworks. The importance of governance has been emphasized in other contexts by others: Peter Conti-Brown (2016, page 26), for example, in describing the Federal Reserve notes that “Having the right institutional design...isn’t a side show to the real questions of monetary policy and financial regulation. Governance may in fact be the whole show.”

There are two reasons for the interest in the governance for time-varying policies. The first reason relates to concerns that have been expressed in recent years about financial stability risks that could arise from sustained low interest rates, such as asset bubbles and excessive risk-taking that could leave economies vulnerable to a fall in asset prices. These concerns have been the focus of many country and cross-country financial stability reports, including the October 2016 and April 2017 IMF Global Financial Stability Reports (GSFR) and the November 2016 report by the ESRB on macroprudential policy issues arising from low interest rates.

Second, while the arrangements to address structural risks, such as writing new regulations to enhance bank capital and liquidity standards, are grounded in the standing microprudential regulatory system, the governance framework for implementing macroprudential policies for cyclical risks is new and less well-established. Before the recent crisis, few countries actively adjusted tools, such as mortgage loan-to-value ratios or bank stress tests, in response to building cyclical macrofinancial risks, and the countercyclical capital buffer (CCyB) is a new tool introduced in Basel III.¹ Such policies also likely involve some political considerations, such as a tradeoff between reducing rapid mortgage debt growth and expanding homeownership, and require greater coordination across agencies to be successful. To the extent that the governance for countercyclical policies is weak, then financial stability authorities are not positioned to provide meaningful options to monetary policy to address financial stability concerns.

For our analysis, we start with a sample of 64 countries that have used some macroprudential tools since 2000, as determined by Cerutti, Correa, Fiorentina, and Segalla (2016). This initial selection of 64 countries, combined with a few other considerations as detailed in section 2, leads to a sample of 58 countries as of 2016. Relative to samples used in previous studies of governance, most of which are based on a 2010 IMF survey (Nier, Osinski, Jacome, and Madrid, 2011), our sample has substantially more advanced economies than emerging market and developing economies, and incorporates the large number of new authorities created since

¹ See Kuttner and Shim (2013) – and specifically Figure 2 – where the infrequent use of mortgage loan-to-value ratios to address cyclical macrofinancial risks pre-crisis is documented.

2010. We collect information directly from national authorities' websites and financial stability reports, IMF Article IV reports, and, where available, IMF financial sector assessment program (FSAP) reports. We performed significant cross-checks against other papers, though our measures of macroprudential governance structures are, nonetheless, based on our interpretations of public statements.

We document that many countries have put in place new institutional arrangements to monitor and communicate views about systemic risks, but they have made more modest changes to how they would take macroprudential policy actions. Of the 58 countries in our dataset, 41 have formal financial stability committees, of which most were created since 2010, and the ministry of finance is much more frequently the chair than the central bank. Another 14 countries have placed the responsibility for macroprudential policies with the central bank as a single entity, although a few appear to have informal communication arrangements with other regulators or the government. However, only two financial stability committees can directly implement countercyclical policies, and these two countries and 9 others can issue "comply or explain" directives, in which an agency is expected to respond by taking the directed action or explain why it did not.² In addition, while most countries have authorities for setting countercyclical capital buffers, bank stress test parameters, and residential mortgage loan-to-value ratios, the financial stability committee almost never directly controls these tools. These characteristics suggest that most committees appear to function to promote information sharing and coordination, rather than to directly implement policies.

To get some qualitative indications of decision-making and how differences in agencies affected the process, we looked closely at decisions in the six countries with financial stability committees that have raised the CCyB. Based on public narratives, central banks in three countries – Norway, Sweden, and Switzerland – had wanted the initial increase in the CCyB to be larger or to have been put in place more quickly than the agency (either the ministry of finance or prudential regulator) making the CCyB decision. The review also highlighted that financial stability committees are generally not the primary decision makers.

Next, we examined empirically whether the new structures are related to country characteristics which indicate a need for coordination across multiple agencies. In light of the emphasis by international authorities on the importance of a prominent role for the central bank, we also examine whether the structures are related to more unique attributes of central banks. In particular, we estimate logit-model regressions to examine whether national authorities set up a

² We omitted the European Systemic Risk Board from our database because it is a supranational financial stability committee. As discussed in section 3a of the paper, this committee has comply and explain powers over EU countries. In addition, some committees may have some structural tools. For example, the United States' Financial Stability Oversight Council, also has authority to designate a nonbank financial firm as systemically important, but we do not view this tool as a cyclical tool.

formal or de facto financial stability committee, as opposed to a single agency responsible for macroprudential policy or an informal inter-agency arrangement. We also examine for these committees which agency is designated to be the chair. We are especially interested in considering how the decision to set up a committee is affected by a motive for regulatory coordination, which may arise because of multiple agencies with different mandates and tools, and perhaps to build consensus for countercyclical actions that might not be politically popular. We also examine if the designation of the chair is affected by central bank characteristics, such as whether it is a prudential regulator, skill advantages in performing macroeconomic analysis related to setting monetary policy, or it's political independence for monetary policy.

A key finding is that committees appear to be designed to enhance coordination rather than to take advantage of informational synergies when a central bank is also a prudential regulator. We distinguish these hypotheses using two indicator variables – specifically, the central bank is the prudential regulator for the banking sector (35 of 58 countries), and the central bank is the regulator for more than the banking sector, including nonbank financial firms and/or markets (18 of the 35 countries). When a central bank is a regulator of banks or more than banks, there likely are a smaller number of other financial regulators and less need for coordination by a committee. In a regression to explain committee formation, we would expect negative coefficients on these two indicator variables if committees are designed to improve coordination among multiple regulators. We find negative coefficients on both variables, though significant only for the central bank as a regulator for more than the banking sector, consistent with the coordination motive for forming an FSC. Other results also support a motive for coordination: Committees are more likely in large countries, where there may be more interests to coordinate, and in countries with stronger rule of law, which may make coordinating committees more effective.

In addition, if committees are designed to take advantage of information synergies, we would expect the coefficients on the two indicator variables to be positive in the regression of whether the central bank is made the chair of a committee. However, we do not find the coefficient on the central bank is a regulator variable to be positive or significant. Moreover, we find that the central bank is less likely to be the chair in countries that have had a greater number of financial crises, suggesting that countries want the ministry of finance to be a committee member if fiscal expenditures are more likely to be needed in a crisis, also consistent with the coordination objective for creating FSCs.

For the central bank as the single macroprudential authority, rather than a financial stability committee or other arrangement, results support both motives that arrangements are designed to coordinate and to take advantage of information synergies. A central bank single authority is more likely when the central bank also regulates nonbank financial firms and markets, consistent with taking advantage of information synergies and less need for coordination of multiple

regulators. This arrangement is also more likely in smaller countries, where there may be less need for formal coordination of interests.

In addition to the empirical results for financial stability committees supporting greater coordination, the results are mixed in terms of utilizing central bank attributes that might lead to more effective macroprudential policy formulation. The likelihood of the central bank as chair is positively related to credit-to-GDP, an indicator of a country's financial deepening and advancement, which may argue for a central bank's macro-based analytical skills for policymaking, such as in decisions for the countercyclical capital buffer, but is not related to other measures such as gross capital inflows-to-GDP (or the current account-to-GDP), or the volatility of GDP. From a political economy perspective, we do not find significant support that countries are more likely to make the central bank the chair of the committee if it were more politically independent in its monetary policy, a characteristic that by extension might allow it to be more independent for financial regulatory countercyclical policies. We do find that the central bank is more likely the chair in countries with a stronger rule of law, suggesting perhaps that strong legal protections allow countries to grant central banks additional authorities with fewer concerns of excess power.

Overall, the governance arrangements and empirical analysis of its determinants are consistent with a view that committees are set up to enhance coordination rather than to take policy actions. Most committees do not have new tools and they do not appear to be designed to take special advantage of central bank macro-based skills and attributes that might lead to more effective countercyclical policies. Nonetheless, the arrangements align with the commonly-held view that macroprudential policymaking requires coordination and interaction among existing regulators and macro policymakers. A CGFS (2016a) paper highlights the importance of wide cooperation because the skills required for appraisals of macroprudential tools are unlikely to exist within one entity, expert judgment is needed given the nascent science, and policy effectiveness may depend on the setting of other policies. Bodenstein, Guerreri, and LaBriola (2014) find in simulations with two policymakers that recognition by each policymaker of the others' objectives can improve policy formulation, by moving a suboptimal Nash equilibrium allocation notably closer to the cooperative policy outcome. Thus, the new financial stability committees have the potential to be beneficial.

However, this structure raises the concern – similar to that associated with the widespread growth in the past couple of decades in the production of financial stability reports – that current committee arrangements will lead to better monitoring and communication but not necessarily better financial stability outcomes. Cihak, Munoz, Sharifuddin, and Tintchev (2012) found that the number of central bank financial stability reports and hence communication about risks rose dramatically since 1996, but did not appear to lead to better outcomes. In addition, countries may not be able to achieve new financial stability mandates if members' existing tools are

already being used to achieve their other existing mandates. Carrillo, Mendoza, Nuguer, and Roldan-Pena (2017) simulate welfare costs when there is only monetary policy to achieve both price stability and moderation in credit spreads relative to two separate tools for the two targets. They show deviations from the Tinbergen principle have a significant quantitative effect on welfare. Financial stability committees may be structured intentionally for information sharing rather than policy implementation, given that – as documented by Elliot, Feldberg, and Lehnert (2013) for the United States – some policy actions can be viewed as credit allocation in practice, and be politically unpopular.

Thus, on balance, our review suggests that while financial stability committees are designed to promote greater coordination, most will not meaningfully enhance financial stability because they lack direct authorities to set macroprudential policies. As a result, financial stability committees are not positioned to provide meaningful alternative policy options to monetary policy to address cyclical financial stability risks.

Our paper is related to Nier et al. (2011), that provides a summary of macroprudential institutional frameworks, based on IMF case studies and a 2010 survey with responses from 50 countries.³ The paper also is related to Lim, Krznar, Lipinsky, Otani, and Wu (2013) that 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 central banks and governments in macroprudential regulation. We build a database, which is larger and includes data through 2016, and show that important changes have taken place since 2010, especially the increase in committees that involve multiple agencies. Lim et al link their measure of central bank strength to the time to take policy action, and find a small effect on faster actions if the central bank has a stronger role. We do not formally estimate any linkages between the new governance set-ups and policy implementation since many of the structures were only put in place in the past few years and there has been fairly limited use of time-varying tools. Instead, we look more closely at the authority to use some tools, and decisions in eight countries that have to date raised the countercyclical capital buffer above zero, and leave further empirical work with this database to the future after more policy actions have been observed.

Other studies of financial stability authorities have not focused specifically on macroprudential policies or governance. Lombardi and Siklos (2016) develop a broad measure of a country's

³ They catalog 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 organizational separation of decision making and control over instruments; and (v) whether there is a coordinating committee that, while not itself charged with the macroprudential mandate, helps coordinate several bodies.

capacity to implement macroprudential policy, but they include considerations such as whether the country has deposit insurance, and so captures many elements other than governance.⁴ Smaga (2013) focuses specifically on the central bank, and excludes other entities, and is broader than macroprudential policy as well, since it includes involvement in the payments system, in liquidity support (roles also considered by Healey, 2001), supervision, as well as whether central banks have financial stability mandates, how they view their role in financial stability, how they organize their financial stability function internally, and whether they publish financial stability reports (roles also considered by Osterloo and de Haan, 2003).

Our empirical analysis of the strength of the central bank also incorporates the political economy perspective of Masciandaro and Volpicella (2016), who examine the strength of the central bank in the macroprudential policy infrastructure of 31 countries, using an index from Lim et al (2013). Our dataset includes a larger number of countries and is more up-to-date, and reflects the growth in financial stability committees from 2010 to 2016. They find that if the central bank already has micro supervisory responsibilities for banks, it is more likely to have a stronger role, which they argue reflects a desire to take advantage of informational advantages. We reach a different conclusion, namely that, once set-up, financial stability committees are not taking advantage of informational advantages. What leads us to this conclusion is our additional information about the central bank as the prudential regulator of banks and also a regulator of nonbank financial firms and markets. In addition, we separate the governance structures where the central bank is a single authority or is the chair of a multi-agency committee.

We also interpret the observed arrangements in the context of Tucker (2014, 2016), who considers the appropriate assignment of authorities for time-varying policies across agencies. 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, thereby precariously high. This consideration he notes would argue for entrusting authority for time-varying policies with unelected officials.⁵ That said, time-varying policies to affect credit cycles and to reallocate credit have important distributional consequences, and such decisions should rest with elected, rather than unelected, officials.

The rest of the paper is organized as follows: Section 2 describes the basic governance structures, and Section 3 looks at which agencies have authorities for macroprudential tools, and reviews

⁴ They summarize eight broad criteria, which are based on 30 elements: implementing macroprudential policy; coordination and responsibility for macroprudential policy; deposit insurance; transparency and accountability; organizational structure of the central bank; view of central bank of links between monetary policy and macroprudential policy; distance to FSB/G20 recommendations; and response time to recommendations.

⁵ The ESRB's guidance to countries on their macroprudential policy framework emphasizes the authorities should be shielded against outside pressures through independence; see,

https://www.esrb.europa.eu/pub/pdf/recommendations/2011/ESRB_2011_3.en.pdf.

decisions and the tensions they reveal among regulators when implementing the CCyB. Section 4 reviews the basic reasons for a prominent role for the central bank and Section 5 present results of an empirical exploration of factors to help explain which entity is in charge of macroprudential policies. Section 6 concludes.

2. Characteristics of Governance Structures for Macroprudential Policy

We collect data on governance structures for a sample of 58 countries (listed in Table A.1 of the Appendix). A brief outline of how we collected our data is provided in the first subsection and a description of our findings is given in the second subsection.

a. Sample and data sources

We started with the sample of 64 countries in the macroprudential policy tool database of Cerutti, Correa, Fiorentino, and Segalla (2016) that are identified as countries having used macroprudential policies in a time-varying way. We dropped from the database, however, six of the seven countries 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 G-20 countries in our dataset. We did, however, drop Taiwan, which is part of the Cerutti et al database, because of the lack of information about its governance structure. We also added Cyprus, not in the Cerutti et al database, because it is the only EU country excluded from that database and we wanted to include the full set of EU countries. This process results in a sample of 58 countries, of which 28 are advanced economies and 30 are emerging market or developing economies, as categorized Amone and Romelli (2013), which are consistent with the IMF's 2007 WEO report.⁶

The main sources for our information on countries' financial stability governance structures, safety and soundness authority responsibilities, and tool availability were national authorities' websites (and further documents referenced therein), national authorities' financial stability reports, IMF Article IV reports, and, where available, IMF financial sector assessment program (FSAP) reports. In addition, we undertook various cross checks, including comparing what we inferred about financial stability governance structures from our sources with Lombardi and

⁶ More recent IMF WEOs have added 7 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 website titled "Changes to the World Economic Outlook Database," October 04, 2016 – link: <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 most new structures were beginning to be formed.

Siklos (2016) on macroprudential policies, with Nier et al (2011) on safety and soundness for microprudential policies, and with an appendix table on institutional structure in a recent IMF/FSB/BIS report (2016).⁷ For information about the availability of tools, we additionally consulted responses to the IMF's Global Macroprudential Policy Instrument (GPMI) survey for 2013 data. 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.

b. Financial stability committees (FSCs) and single agencies

Our review of governance structures finds that 41 of the 58 countries have formal or de facto FSCs (Table 1). Of these 41 countries, 35 have a FSC created formally by legislation and six countries have a de facto FSC, which means that a committee exists and meets regularly but exists only from non-legal arrangements between the agencies, such as memorandums of understanding (MOUs). Of the 17 countries that do not have formal committees, we determine that 15 have assigned, at least in practice, macroprudential responsibilities to a single institution, and of these, 14 have the central bank (CB) as the single authority and one country has the prudential regulator (PR).^{8,9} The one case is Peru, for which it is the PR, which is separate from the CB. 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 countries without a FSC have informal information sharing and coordination arrangements in place among agencies. For example, Saudi Arabia has interagency arrangements for financial stability that, like in Israel, appear to be moving toward the more formal formation of a FSC. 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 (MoF), which says that the governor must consult with the minister when macroprudential policy actions seem likely. In Singapore, where “stamp duties” have been an

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 cross checks, there were instances in which we differed. Our approach in these instances was to re-check our sources and if we considered our assessment to be correct we proceeded with that.

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

⁹ Of the 17 countries, 10 are EU members, which means that under the ESRB's recommendation on the macro-prudential mandate of national authorities (ESRB 11/3) they are required explicitly to designate a macroprudential authority. In nine of these countries the CB is the designated authority, and in one country – Finland – the PR is the designated authority. In the seven non-EU countries, the extent to which the macroprudential authority is explicitly designated 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.

important policy tool to address rapidly increasing house-price valuations, informal consultative arrangements are in place between the CB and MoF.

Most of the 41 FSCs that are in existence today were created relatively recently and, specifically, after the recent 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 countries. These recent dates indicate the importance of ongoing updates on progress.

For the 41 countries that have formal or defacto FSCs, we define leadership by the chair of the committee, since the chair sets the agenda and often serves as the government's official voice on macroprudential policies. As shown, the MoFs and CBs are the most frequent chairs. The MoF is the chair or co-chair of 25 FSCs and the CB of 18 FSCs. In no country is the PR the sole chair. In two countries – Romania and Brazil – the chair of the FSC rotates between members and in two countries with de facto FSCs – Japan and the Philippines – there is no FSC chair.

In our analysis, we include separately each of the 19 countries in the euro area rather than treat 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 countries have a formal or de facto FSC, one country has an informal committee, and seven countries have designated the CB as the single authority. Moreover, for the 11 FSCs, seven have designated the MoF as the chair and four have designated the CB as chair. In general, the larger countries, including France, Germany, Italy, and Spain, have a FSC with the MoF as chair.

Most (33 of 41) formal or defacto FSCs have three to five agencies as members with voting rights: 15 have four voting agencies, nine have three, and eight have five. Only three FSCs have members from more than five agencies and five FSCs have members from only two agencies. CBs, MoFs, bank PRs, securities regulators, and deposit insurers are frequent FSC members, where in many cases these types of agencies may be within the same institution. Note that we are reporting here the number of agencies represented and that vote, not the number of members of the committee, to better represent the structure and potential diverse interests 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, a typical representation of 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 countries 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 should facilitate policy coordination.

Table 2 provides more detail on the position of the key agencies – the CB, MoF, and PR – in the financial stability governance structures of the countries in our dataset. The data suggest the CB often has a formal leadership role. As shown, the CB is a single authority in 14 countries (and is also a PR in those cases), and is the sole chair or co-chair in 18 countries that have financial stability committees. In contrast, the MoF is never a single authority. But when it is a member of the committee, it is more likely to be chair or co-chair than the CB; that is, it is chair or co-chair in 25 of 34 committees of which it is a member. PRs are always represented, either as part of the CB or independently, which is not surprising since most macroprudential tools would apply to regulated financial firms. However, when the PR is not part of the CB, it is never the lead authority. These tabulations differ from Lim et al (2013) because they represent more recent arrangements and a larger sample that, in particular, includes more advanced economies.

3. Authorities for Macroprudential Tools

In addition to membership and leadership of macroprudential authorities, an important metric of governance effectiveness is authority over tools. In this section, we evaluate direct tools of the FSCs, including communication, and separate tools of the members.

a. Direct tools of the FSCs

Few FSCs have what the IMF/FSB/BIS report (2016) and the IMF *Key Aspects of Macroprudential Policy* (2013) 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 to direct countercyclical actions (Table 3, column A). Two of the 11 countries, France’s High Council for Financial Stability and UK’s

Financial Policy Committee, have hard powers over time-varying macroprudential tools.¹⁰ Nine of the 11 have only semi-hard powers, which is the authority to make recommendations with formal comply or explain authority. Note also that the European Union's ESRB, which we have not included in our dataset due to its supranational status, also has 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, which is an even softer power. Thus, it appears that most committees appear to function to promote information sharing and coordination, rather than to directly implement policies.

The IMF views comply or explain powers for FSCs as well-suited to situations where further judgment by a member agency is important, and where a policy action is expected to face considerable political pressure and broad support and transparency for an agency’s actions are needed (see IMF, 2013). Comply or explain powers may be more practical for addressing the structural component of systemic risk since they may be better suited to macroprudential policy interventions that are less frequent in nature. An example of this is the U.S. FSOC’s 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 also be directed at cyclical risks. For example, in June 2014 the U.K. 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 (specifically, Austria, Belgium, Denmark, Finland, Luxembourg, the Netherlands, Sweden and the United Kingdom).¹¹ MoFs in seven of the eight countries replied in writing, most often citing they were already monitoring the situation and some had already taken actions, though one country wrote that the warning was not justified.

¹⁰ The U.S. Financial Stability Oversight Council (FSOC) can designate nonbank 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 PRA rather than the FCA 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 busts with an intent to promote moderate credit growth.

¹¹ Heads of national macroprudential authorities also received copies of their countries’ warning. The ESRB’s rationale for sending the warnings to MoFs was that potential policies may extend beyond the mandate of macroprudential authorities (see

https://www.esrb.europa.eu/pub/pdf/reports/161128_vulnerabilities_eu_residential_real_estate_sector_qa.en.pdf

Communication is an important soft tool and can raise public awareness of risks and understanding of the need for authorities to take mitigating actions (see IMF, 2013 and 2014, and CGFS, 2016b). A principal form is through financial stability reports (FSRs), though studies suggest that they have limited success as a policy tool. Only a few FSCs publish FSRs, including the U.S. Financial Stability Oversight Council (FSOC) and Mexico's Council for the Stability of the Financial System (CESF), since central banks have continued to publish FSRs. Cihak et al (2012) document the rapid growth from 1 to 80 in the number of CBs that published FSRs between 1996 and 2011. However, they document the general lack of "forward-lookingness" in FSRs, making them less capable of assessing systemic risks. Lim et al (2017) review the quality of 20 FSRs and find only eight explicitly declare the aims and objectives of the report, which makes them less helpful to encourage informed debate and to guide decision-making. Relatedly, Correa, Garud, Londono, and Mislang (2017) document that while the sentiment conveyed in countries' 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.

Our finding that many FSCs do not have their own tools – comply or explain or powers to direct actions – raises the possibility that countries' having FSCs will lead to a similar outcome as their having FSRs; that is, that 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.

b. Authorities for time-varying tools

Since our review found that very few FSCs have hard tools, we looked further at whether individual agencies had authorities to implement time-varying tools. We focus on just a few, namely loan-to-value ratios (LTVs), based on analysis in Cerutti et al (2016) of the frequency of use, and then added the new countercyclical capital buffer (CCyB) and bank stress tests, which have become more macroprudential in some countries. Cerutti, Claessens, and Laeven (2014) review the use of 12 macroprudential tools, but most were changed very infrequently over 2000 to 2013. Cerutti et al (2016) show that only LTVs and reserve requirements (for purposes other than monetary policy) are correlated with credit growth in a way to suggest they have been used to reduce a boom-bust credit cycle.¹²

¹² The other three tools, general capital, concentration limits, and interconnections, had not been adjusted in a way consistent with countercyclical intentions. Their finding that capital is not a countercyclical tool is because the documented use mostly 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. In addition, we assume

Overall, our tabulation suggests that while most countries have the authorities for CCyB, stress tests, and LTV adjustments, the FSC almost never directly controls these tools. Rather, it is the CB or the PR that have the authorities for these specific tools.

The CCyB is of special interest because it is a new tool, and is strictly a macroprudential rather than an individual bank safety and soundness tool. It is calibrated generally to system-wide rather than bank-specific risks and allows for cross-border reciprocity arrangements, so it seems plausible that countries could have established the authority at the new FSCs or it would involve the MoF (or government more broadly). On the other hand, the tools can be applied to regulated banks only and it would be calibrated based on time-varying system-wide financial vulnerabilities, skills that would normally be at the CB. The vast majority, 53 countries, have established the authority to set the CCyB (Table 3, column B), but only two countries have the FSC as setting the CCyB. The CB has the power in 31 and the PR has it in 16, and the MoF (or government more generally) in four, 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.¹³

The findings for stress tests are similar. Stress tests based on macro-based risks are a relatively new tool, but have been adopted widely since the crisis. The CB is the primary authority in 37 countries and the PR in 18 countries (Table 3, column C). Among the 37 CBs, 33 are also PRs. In no countries is the FSC or MoF in charge, even less than in the case of CCyB. 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, LTVs are borrower- rather than lender-based, suggesting political or other factors, such as homeownership goals, may be considerations and a more system-wide analysis is needed. We tabulate that 39 countries have established the authority for LTVs, less than for CCyB and stress tests, although we recognize that countries may be able to establish a new authority if they were to want to use LTVs as a macroprudential tool (Table 3, column D). Again, we find that FSCs do not direct the setting of this tool. The FSC has authority in one country, while the CB has the authority for 22 countries, the MoF has the authority for nine countries, and the PR for seven countries.

the CB retains the authority for reserve requirements, even if a FSC exists, and as such do not include this tool in Table 3. (Recall that only two FSCs have hard tools – the U.K.’s Financial Policy Committee and France’s High Council for Financial Stability – and neither list reserve requirements as one of their policy tools.)

¹³ 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.

Of the time-varying macroprudential policy tools, LTVs have the most cases of authority being assigned to the MoF. This outcome is consistent with Tucker (2014, 2016) that policies like LTVs, because they have distributional consequences, should not be directed by unelected officials in independent agencies. A statement by Belgium's CB illustrates the issue. Belgium's CB, the appointed macroprudential authority in that country, writes in its CCyB framework documents that while the CB as the PR would be the appropriate authority to set the CCyB, it would be more appropriate for the government to set LTV ratios because of their distributional impacts.

[T]he Bank was endowed with a wide range of macroprudential instruments which may be activated to mitigate emerging systemic risks. The Bank can impose additional capital or liquidity requirements, but also has tools beyond capital- and liquidity-based ones at its disposal. In view of their distributional impact, the Bank nevertheless has no responsibility for activating lending limits. In particular, imposing ceilings on the amount of mortgage debt in relation to the value of property and the level of debt repayments relative to income is a competence of the federal government.¹⁴

In summary, FSCs rarely have direct authorities for these time-varying tools. That said, FSCs in which the traditional agencies participate as members could still – per the findings of Bodenstein et al (2014) – benefit from improved information sharing and coordination so leading to improved policy outcomes and in our dataset there are several examples where this could be the case. For example, in countries where the PR has the authority for the CCyB, stress tests, or LTVs, the PR is a member of the FSC in all but one or two countries. Likewise, in countries where the MoF (or the government) sets LTV ratios there exists a FSC (of which the MoF is a member) in all but one country. In only one case where the government sets the CCyB – specifically, in Switzerland – is the MoF not on the FSC. However, in this case there is a clearly-articulated process for consultations with the CB and PR. Nonetheless, conflicts for policy use could arise if the member agencies do not also have a financial stability mandate.

4. Special Role of the Central Bank

a. Rationale for the special role

There is a commonly-held view that central banks should be prominent in macroprudential policy making (see IMF, 2011, and ESRB, 2012).¹⁵ For example, the ESRB recommends “the national central banks should have a leading role in macroprudential oversight because of their expertise related to setting policies for price and exchange rate stability, and existing

¹⁴ https://www.nbb.be/doc/ts/publications/buffer_rate_policy_strategy.pdf

¹⁵ Earlier studies of financial stability policymaking capacity focused almost entirely on the central bank rather than coordinating bodies (Smaga, 2013).

responsibilities in the area of financial stability. This conclusion is further strengthened when central banks are also in charge of microprudential supervision.” (See, ESRB, 2011.) There may also be a concern that if CBs are not especially influential and authorities does not use macroprudential policies to reduce financial stability risks, the CB may feel pressured to use monetary policy, even if it were not the best tool.

In our sample, the CB is the lead macroprudential authority – single agency or chair or co-chair – in 32 countries, just more than half of the sample (Table 4). When it is a single agency, it is also always the bank PR, but when the CB is chair or co-chair of the FSC, the CB is a PR in only 10 of the 18 countries, suggesting the chair is not decided based on whether it is the PR. Even if not a lead authority, a CB could exert influence through its separate authority over tools. Our tabulation indicates that the CB as a single agency (and bank regulator) tends to have authority over the bank sector tools but not LTVs. When the CB is chair or co-chair, it also has authorities for bank tools in nine to 12 countries and LTVs in five countries. This summary of role and authorities suggests an important but not dominant role for the CB in financial stability governance for cyclical policies.

Table 5 provides a summary of the main reasons offered in previous research in favor of a stronger role and a weaker role for CBs in setting time-varying macroprudential policies, which provides guidance for variables to include in regressions below to explain governance structures. Two primary reasons often proposed for a stronger role are informational advantages if it is also a prudential regulator and skill advantages related to monetary policy and lender of last resort responsibilities. In particular, CBs are viewed to have expertise in analyzing macro-based systemic risks that is crucial to inform macroprudential policies to reduce pro-cyclicality risks (Nier, 2009, and Nier, et al, 2011), they are the liquidity reinsurer for the financial system, 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, and the deliberations and processes for undertaking time-varying macroprudential policies are much more akin to monetary policy than are microprudential policies (Tucker, 2014 and 2016). In addition, a strong CB role enables use of the CB’s existing experience in communicating risks to the markets and general public, and it would lead to greater coherence about risk warnings and messages (Nier et al, 2011). Moreover, the CB is an independent authority for its monetary policy functions, and by extension may be better positioned to take countercyclical policies to reduce excess credit growth when such actions might be unpopular.

There is mixed empirical evidence that a stronger role for the CB leads to better outcomes. Nier et al (2011) 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 CB and banking supervisory agencies have lower average costs than those countries with separate arrangements. They cite an earlier study by Goodhart and Schoenmaker (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 buildup of financial imbalances (measured by the ratio of loans to deposits) depends on institutional structure, with a less severe buildup where the CB had full control of supervision and regulation. Lim et al (2013) examine if the institutional arrangements can explain response times for the use of tools to moderate credit growth. 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. They do not find a similar link to the strength of the MoF in the macroprudential set-up.

However, Koetter, Roszbach, and Spagnola (2014) examine for 44 countries whether the CB is also 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. Moreover, these studies focus on the effects of greater CB interaction on the financial condition of the banks, rather than the entire financial system, and do not consider the existence of new focus by regulators on system-wide risks or broader tools.

Arguments for a weaker role include concerns about concentration of too much power at the CB which is run by unelected CB officials (Tucker, 2014 and 2016) as well as lack of institutional mechanisms to challenge the risk assessment views formed within just one institution. A related drawback is the risk of managing too many functions within the CB, and that the function that is most visible to the public will receive the most attention, suggesting monetary policy would get more attention than macroprudential policy at a CB (Tucker, 2014 and 2016).

In addition, time-inconsistency and political pressures can distort the incentives of a CB monetary authority that makes simultaneous monetary policy and macroprudential decisions (Ueda and Valencia, 2012, Smets, 2014). Policymakers in this setting minimize a quadratic loss function for inflation and output variability, augmented with a loss term for leverage variability.¹⁶ When the CB 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 is expected to target financial stability as well as price stability, it will have an incentive to

¹⁶ 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).

inflate away debt. Knowing this, macroprudential policy will be lax, which will lead to higher optimal debt and an upward inflation bias. Smets (2014) argues 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 argument to separate policies 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.

b. Role of CB in recent CCyB decisions

Recent decisions by some countries to raise the CCyB illustrate the role of the central bank. In particular, of the eight countries that have raised the CCyB, the central bank is the authority or prepares the analysis and makes a recommendation in seven of the eight countries, while FSCs play a role in only two countries (see Table 6 and Appendix B for more detail). Thus, CBs play a more direct role than FSCs. The decisions also illustrate that the analysis provided for a CCyB decision involves evaluating the credit-to-GDP gap and other variables that are aligned more with the macro-based economic and financial skills of CBs rather than firm-specific risk assessment skills of PRs. In addition, in three countries, Norway, Sweden, and Switzerland, there are clear indications that the CBs had wanted the CCyB to be larger or put in place more quickly than did either the PR or the government, at least initially. For example, in a Riksbank memorandum:

The Riksbank welcomes Finansinspektionen's decision to activate the countercyclical buffer and finds that this is justified in light of the increased systemic risks and with the purpose of strengthening the resilience of the banks. However, the Riksbank is of the opinion that the countercyclical buffer rate should be set at 2.5 per cent. This is because of the developments on the housing market in recent years as well as the high and growing indebtedness in the Swedish household sector. ... Finally, the Riksbank finds that it would be desirable to have a shorter phasing-in period than 12 months.¹⁷

¹⁷https://www.esrb.europa.eu/pub/pdf/other/140910_Decision_memorandum_CCB_Sweden.pdf?4ed26e2358ae71830daedadb070dce1f

5. Empirical Analysis of FSC Structures

In this section, we investigate two dimensions of countries' financial stability governance structures and the role given to the CB. The first dimension is whether a country decides to set up a formal or de facto FSC as opposed to an informal inter-agency arrangement or a single agency responsible for financial stability. We also look separately at what determines whether a CB is given single authority for financial stability. The second dimension is which agency within the FSC is designated to be the chair of the committee. We begin this section by defining the dependent variables for our analysis. We then describe the regressions and explanatory variables before reporting the regression results.

a. Dependent variable definitions

We construct two variables to investigate a country's governance structure. The first variable relates to the existence and formality of the set-up of a FSC. This variable, called "Formal or de facto FSC" (*Form_or_DF_FSC*), is assigned a value for each country according to the following definition:

- $Form_or_DF_FSC = 0$, if no FSC exists or if only an informal FSC exists; and,
- $Form_or_DF_FSC = 1$, if a formal or de facto FSC exists

This variable is defined for all 58 countries in our dataset and so our regressions to explain this variable will include 58 observations.

The second variable that we construct is the country's decision to give an agency sole authority for financial stability. In our sample, the CB is the single authority in 14 of 15 countries, so we consider only the decision of CB as single agency. In addition, because CBs are the single agency only when they are also the PR, we define the variable as follows in countries for which the CB is also a PR. This variable, called "CB in PR and FS" (*CB_in_PR_and_FS*), is assigned a value for each country according to the definition:

- $CB_in_PR_and_FS = 0$, if the CB is a PR but *is not* the economy's macroprudential authority either in effect or by designation; and,
- $CB_in_PR_and_FS = 1$, if the CB is a PR and *is* the economy's macroprudential authority either in effect or by designation.

This variable is defined for the 35 countries in our dataset for which for the CB is also a PR, which means that our regression to explain this variable will include 35 observations.

We then construct two variables to investigate which agency – the CB or the MoF – within the FSC is designated to be the sole chair of the FSC.¹⁸ The first variable is "Central bank as the financial stability committee chair" (*CB_as_FSC_Chair*), where:

¹⁸ We look only at sole chairs since most of the co-chair arrangements are the CB and MoF, and thus including co-chairs would make it more difficult for factors to distinguish between the alternatives.

- $CB_as_FSC_Chair = 0$, if a FSC exists and the CB is a member of the FSC but is not the sole chair; and,
- $CB_as_FSC_Chair = 1$, if a FSC exists and the CB is the sole chair of the FSC.

This variable is defined for the 40 countries in our dataset for which for the CB is a member of the FSC, which means that our regression to explain this variable will include 40 observations. Of the 41 countries in our database that have FSCs, in only one country –Chile – is the CB not a member of the FSC.

The second variable is “Ministry of finance as the financial stability committee chair” ($MoF_as_FSC_Chair$), where:

- $MoF_as_FSC_Chair = 0$, if a FSC exists and the MoF is a member of the FSC but is not the sole chair of the FSC; and,
- $MoF_as_FSC_Chair = 1$, if a FSC exists and the MoF is the sole chair of the FSC.

This variable is defined for the 34 countries in our dataset for which for the MoF is member of the FSC, which means that our regression to explain this variable will include 34 observations. Of the 41 countries in our database that have FSCs, in seven countries – Brazil, China, Japan, Malaysia, Malta, Switzerland, and the U.K. – the MoF is not a member of the FSC.

b. Regressions and explanatory variable definitions

For our empirical analysis of decisions to set up FSCs, CB as single authority, and the chair of the FSC, we work with a set of baseline logit-model regressions, which (in all but one case) have the same seven regressors that we describe below. We test for motives to foster coordination across multiple agencies and to take advantage of attributes of the CB, including: (1) the CB’s information advantage as a PR, (2) the CB’s skills advantage in performing macroeconomic analysis acquired from undertaking monetary policy, and (3) the CB’s political independence, which may allow it to implement unpopular countercyclical policies. An offset is that a country may want to avoid excess concentration of power at the CB.

For the regressions that consider a country’s decision to set up an FSC the baseline regression is:

$$1. \ Form_or_DF_FSC = 1 / Form_or_DF_FSC = 0$$

$$=f(\text{CB a PR indicator, CB wide PR, Rule of Law, Number of crises, log GDP, Coefficient of variation of GDP, WEO Advanced economy}).$$

For the regressions that consider a decision to establish a single authority, which in our sample means a CB that is also a PR having sole responsibility without an FSC being created, the baseline regression is:

$$2. \ CB_in_PR_and_FS = 1 / CB_in_PR_and_FS = 0$$

$= g$ (CB wide PR, Rule of Law, Number of crises, log GDP, Coefficient of variation of GDP, WEO Advanced economy).

Note that this regression, the CB as a PR is dropped from the regression because all CBs in this regression are banking system PRs, so there would be no variation in the values of this variable.

For the regressions that consider a country's decision to make the CB the sole chair of the FSC the baseline regression is:

$$3. \quad CB_as_FSC_Chair = 1 / CB_as_FSC_Chair = 0$$

$= h$ (CB a PR indicator, CB wide PR, Rule of Law, Number of crises, log GDP, Coefficient of variation of GDP, WEO Advanced economy).

For the regressions that consider a country's decision to make the CB the sole chair of the FSC the baseline regression is:

$$4. \quad MoF_as_FSC_Chair = 1 / MoF_as_FSC_Chair = 0$$

$= k$ (CB a PR indicator, CB wide PR, Rule of Law, Number of crises, log GDP, Coefficient of variation of GDP, WEO Advanced economy).

Note that regression (3) for $CB_as_FSC_Chair$ is the one most similar to analysis in Masciandaro and Volpicella (2016). Their dependent variable, constructed by Lim et al (2013), takes on one of four variables in describing the role of the CB in macroprudential policy and, as such, these authors consider many different roles for the central bank in one single equation instead of considering separately various financial stability governance-structure decisions as we do in our analysis. In addition, because we have a larger updated dataset and we expand our explanatory variables related to the CB being a PR, we reach different conclusions about information synergies.

The main explanatory variables that are included in equations (1) to (4) are described below, and their sample characteristics are summarized in Table 7. Many of the explanatory variables are measured in 2007 just before the recent financial crisis and before most of the FSCs were created, to represent information available to country authorities when establishing the FSC structures. Note also that in our regressions we assume that the microprudential regulatory structure is largely fixed when countries set up their financial stability governance structures.¹⁹

¹⁹Although outside the scope of our study, our review of countries' FSCs uncovered only a few instances of countries' reorganizing their microprudential prudential regulatory structures. Hungary and Belgium had created FSCs but later changed to a single macroprudential authority after moving the PR into the CB. Hungary, following the financial crisis in 2010, created a 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 September 11 terrorist attacks, created a business-continuity oriented FSC consisting of the CB and PR (also a market regulator). In 2010,

- The central bank as bank prudential regulator, *CB a PR indicator*, and the central bank as a wide prudential regulator, *CB as wide PR indicator*, proxy two characteristics: the number of financial regulatory agencies and informational advantages of the CB from also being a microprudential regulator. If a CB is also a PR or a wide PR, then there likely are fewer agencies to coordinate across. If FSCs are designed for coordination, we would expect negative coefficients on these variables. In addition, if a CB is a PR, it has a substantial information advantage over other regulators and the MoF about potential system-wide risks to financial stability arising via the banking system. If a CB is also a PR to institutions other than banks – where this most likely includes also being the insurance regulator, though also the pension regulator and/or the securities regulator – its information advantage is even greater. Were authorities keen to exploit information advantages, we would expect *CB a PR indicator* and *CB as wide PR indicator* equaling 1 to induce authorities to designate the CB as the single authority, and to not set up a FSC. And, were authorities to create a FSC, these information advantages would likely induce authorities to designate the CB as the FSC chair and not the MoF as chair.
- *Rule of law* is a governance indicator variable created by the World Bank to capture the traditions and institutions by which authority in a country is exercised. It measures the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts. It is unclear *a priori* if a stronger rule of law would favor a FSC or a single authority. A stronger rule of law would likely facilitate coordination among agencies and, as such, we might expect it to favor the creation of multi-agency FSCs because they may be more effective. Acting against this incentive, however, a stronger rule of law may diminish concerns related to more concentrated power at the CB, either as a single agency or as chair of a FSC. We also looked at the other indicators from the World Bank database that might reflect the functioning of the financial sector, including government effectiveness and regulatory quality, and found they were highly correlated with one another (that is, had simple correlations on the order of .70 to .94), and ultimately chose to use only the *Rule of law* variable in our regressions.
- The number of financial crisis (*No. of crises*) experienced by a country since 1970 is a variable based on Laeven and Valencia (2012). They define a crisis when there is a severe impairment of banking intermediation which required some fiscal assistance. Countries that have had more crises might want more active participation of the MoF or other parts of the government in financial stability because they have fiscal

it moved the prudential regulation of financial institutions into the CB, created a separate markets regulator, and made the CB the single authority for the financial stability. In contrast, Indonesia moved the PR out of the CB into a separate newly-created PR authority. In the United Kingdom, at the same time that the FPC was being created on the macroprudential policy front, changes were underway with regard to microprudential policy. In particular, U.K. Financial Services Authority was dissolved with its prudential responsibilities moved into the newly created Prudential Regulatory Authority and its conduct responsibilities moved into the Financial Conduct Authority.

consequences, and may be needed to coordinate macroprudential policies with fiscal policies. Such participation could be through the establishment of an FSC or through the MoF being chair of the FSC. We also considered the variable fiscal costs-to-GDP of the most recent financial crisis (also from Laeven and Valencia) as an alternative explanatory variable to capture the same considerations as *No. of crises*. But observations for this variable were missing for some countries and it was not significant in our regressions.

- The size of the economy, measured by US dollar denominated GDP and denoted *Log(GDP)*, may affect governance structure since larger economies may imply regulatory authorities being spread across more agencies due to larger economies having more resources to staff different agencies. Greater dispersion may imply a greater need for inter-agency coordination and for a body like an FSC.
- The ratio of the standard deviation of GDP to the average of GDP from 1980 to 2007, known as the coefficient of variation of GDP and denoted by *CV of GDP*, captures the volatility in GDP. High levels of volatility in economic activity may indicate a greater need for time-varying macroprudential policy and therefore the skills of a CB oriented financial stability policy framework.
- *WEO Advanced* is an indicator variable based on the IMF's definitions of whether a country is an advanced economy or an emerging or developing economy in its World Economic Outlook (WEO). The main criteria used by the WEO to classify advanced economies versus emerging market and developing economies are (1) per capita income level, (2) export diversification, and (3) degree of integration into the global financial system. Advanced economies' greater integration with the global financial system likely make an understanding of exchange rates and international currency markets more generally, as well as international financial markets and domestic-international financial linkages more important for undertaking macroprudential policymaking. Given the importance of exchange rates in the transmission of monetary policy, these areas tie in more with the expertise of CBs and may therefore make CBs more likely to have sole authority for financial stability or as chairs of FSCs. On the other hand, greater integration into the global financial system may lead countries to give a stronger leadership role for the MoF, which serves as the government's representative in international financial policy discussions.

We consider a number of variants to regressions (1) to (4). The first type of variant is to add some additional variables to our regressions, where these variables, and the reasons why they may affect financial stability governance structures, are discussed below.

- The number of time-varying macroprudential policy tools that the CB has authority for, which we denote by *CB No. of Macropnu_Tools*, could make it less likely that the CB is given sole authority for macroprudential policy or is made the FSC chair, given that the CB already has some tools at its disposal to undertake financial stability policy.

- Political independence of the CB, as measured by the Grilli, Masciandaro, and Tabellini (1991), is based on the involvement of the government in appointing the CB governor or as a participant for formulating monetary policy.²⁰ Political independence, denoted by *CB Political Independence*, may affect governance structure and make a CB as the sole authority more likely since the more independent the CB, the more able it is to implement policies that might be unpopular. Note also, that *CB Political Independence* was a variable that Masciandaro and Volpicella found to be important in their analysis of CB governance structures.
- The credit-to-GDP ratio, denoted *Credit-to-GDP*, may affect governance structure since an economy with higher credit intensity may have a more advanced financial system and financial deepening which may then encourage the country to have an FSC and include the MoF in financial stability policymaking to coordinate. On the other hand, a high credit-to-GDP ratio may lead to more volatile business cycles, which may encourage the country to put the CB in charge.
- The log of the coefficient of variation of the gross capital inflows-to-GDP ratio and denoted *Log(CV_capital_inflows-to-GDP)*, captures the fact that economies with a large variability of gross capital flows may have higher vulnerability to exchange rate variability and therefore a greater need for time-varying macroprudential policy and the skills of a central-bank oriented policy framework. Note that when we use this variable in our regressions we drop Luxembourg from our sample since its values are an extreme outlier. We also considered the current account-to-GDP ratio in our regressions, although we do not report these results, which are similar to those for growth capital inflows-to-GDP. That said, we prefer to use the gross capital inflow-to-GDP ratio in our regressions since, as noted by Bruno and Shin (2014), gross capital flows rather than net flows are more closely related to in the increased leverage and size of the banking sector and, as such, likely better proxies a country's need for a time-varying macroprudential policy framework.

To check the robustness of our results related to decision of the FSC chair, we consider a few modifications to the definitions of some of the dependent variables in our regressions. Specifically, in regression (3) we alter slightly the definition of *CB_as_FSC_Chair* = 0, while leaving the definition of *CB_as_FSC_Chair* = 1 unchanged, so that:

- *CB_as_FSC_Chair* = 0, if a FSC *does not exist* or if a FSC *exists* but the central bank *is not* the sole chair; and,
- *CB_as_FSC_Chair* = 1, if a FSC *exists* and the central bank *is* the sole chair of the FSC.

²⁰ 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. Given this last criteria, we do not include operational independence.

And in regression (4) we alter slightly the definition of $MoF_as_FSC_Chair = 0$, while leaving the definition of $MoF_as_FSC_Chair = 1$ unchanged, so that:

- $MoF_as_FSC_Chair = 0$, if a FSC *does not exist* or if a FSC *exists* but the ministry of finance *is not* the sole chair; and,
- $MoF_as_FSC_Chair = 1$, if a FSC *exists* and the ministry of finance *is* the sole chair of the FSC.

In contrast to the baseline regressions, these variants combine several governance structure decisions into one. That is, they combine the decisions to form a FSC, its membership, and the chair of the FSC. We are interested in whether the variant that combines the decisions would lead to different interpretations. We find they do not, as shown in detail below.

c. Regression results

FSCs and CB as single agency. The results from regressions (1) and (2) are reported in Table 8. The regressions reported in columns (A) to (D) are whether a FSC has been set up, and regressions reported in columns (E) to (G) are whether a CB that is also a PR is the sole agency. As can be seen, the significant variables in the regressions for whether a FSC is established are roughly those that are significant in whether a CB is made the single authority, though the signs of the coefficients in the two sets of regressions, naturally, are opposite. A key takeaway from the regression results is that FSCs are more likely where greater coordination across agencies is needed, and CB as single agency is more likely when the CB is a broad regulator, beyond just the banking sector, and in smaller countries, which suggests less need for formal cross-agency coordination.

We find in regression (1) that the coefficient on *CB a PR indicator* is not significant, but the coefficient on *CB as wide PR indicator* is negative and significant, indicating a FSC is *less* likely when the CB is also the PR for more than banks. The negative and significant coefficient on *CB as wide PR* is consistent with interagency coordination being a key motive for FSC formation because there is less need for inter-agency coordination when the CB is also the regulator for the lion's share, if not all, of the financial system. While this result could also suggest that FSCs are exploiting the information synergies that such a CB would have regarding the financial system, this interpretation is hard to line up with our finding that there is no significant relationship between the committee and *CB a PR indicator* for banks alone, when information synergies would also exist.

We find in regression (2) that the CB as a wide PR makes it *more* likely that the CB is made a single agency authority for financial stability. This result also is consistent with the coordination motive for forming FSCs, since there is less need for a FSC in countries where most of the financial regulatory functions are in one entity. The result is also consistent with governance set-ups to take advantage of information synergies that arise when CBs are also PRs. However, as

discussed further below, the negative coefficient on *CB as wide PR indicator* in regression (3) for the central bank as chair of a FSC suggests that information synergies are not driving the decisions for CB leadership. Overall, we interpret these findings as more supportive of a coordination motive for forming FSCs, but both coordination and information synergies are consistent with establishing the CB as a single authority.

We would note that the magnitude of the estimated effects of *CB as wide PR*, evaluated at the means for all non-indicator variables, are large. For example, the coefficients in Table 8, column A, indicate that the probability of a FSC being formed in a country is about 30 p.p. lower (at 5 percent rather than 33 percent) when the CB is a wide PR in a WEO advanced economy, while the probability is about 20 p.p. lower (at 78 percent from 97 percent) in other countries. Likewise, the coefficients in column E indicate that the probability of the CB being made the single agency is about 40 p.p. larger (at 93 percent from 49 percent) if the CB is a wide PR in a WEO advanced economy, while the probability is about 20 p.p. larger (at 24 percent from 2 percent) in other countries.

In terms of country characteristics, a stronger rule of law in a country implies a higher probability of a FSC being established and lower probability of a CB being made the single agency, although this effect is significant only in the FSC regressions. As discussed earlier, this may be because a stronger rule of law facilitates coordination among agencies. In addition, a large country, defined by a high level of GDP, tends to have a greater probability of a FSC being established, and a lower probability of a CB as single agency. These results are consistent with larger countries wanting more formal coordination mechanisms across more agencies. In general, the magnitudes of the effects of these variables are small for establishing a FSC, but the effect of country size for CB as a single agency is more substantial. For example, a one standard deviation higher value of *Log(GDP)* implies a probability for the CB being the single agency that is 11 p.p. lower (38 percent rather than 49 percent) in an advanced economy and when the CB is a wide PR.

We also find that a country being a WEO advanced economy, all else equal, implies a lower probability of an FSC being created, and a higher probability of a CB as a single agency responsible for financial stability. As discussed, WEO advanced economies are defined to be more tightly integrated in the global financial system, which means that skills related to exchange rates and international currency markets are more important for macroprudential policymaking, and we consider these results reflect that this is an area where central banks have greater expertise given the importance of exchange rates in the transmission of monetary policy. In alternative specifications, we included gross capital inflows-to-GDP and current account-to-GDP, but they were not significant, and did not significantly change the results for WEO advanced.

In regressions with credit intensity (as measured by *Credit-to-GDP*), we find that it implies a higher probability of an FSC being created, reflecting the fact that higher credit-to-GDP may reflect a more advanced financial sector and a deeper financial system, which may encourage the country to have an FSC for coordination and thereby include the MoF in financial stability policymaking. That said, the marginal effects for this variable very small (altering the probability of a FSC being created by only a couple of percentage points regardless of the values of our indicator variables). In a similar spirit, when *Credit-to-GDP* is included in the regression for CB as single agency, it is not statistically significant. Moreover, variables reflecting macroeconomic risks, the volatility of GDP and the number of crisis, are not significant for either FSC or CB as single agency.

Chair of FSCs. Results for regressions (3) and (4), which consider the decision of whether the CB or MoF is the sole chair of the FSC given that it is a member of the FSC, are shown in Table 9. The regressions reported in columns (A) to (D) are for the CB as the sole chair – regression (3) – and the regressions in columns (E) to (H) are for the MoF as the sole chair – regression (4).

Notably, while the estimated coefficients on the variables in the two regressions tend to have opposite signs, since a characteristic that makes the CB more likely to be the chair should make the MoF less likely (although our sample sizes differ based on whether the CB or MoF are a member of the FSC), none of the variables are statistically significant in the MoF as chair regression. This may reflect that the MoF is a member of only 34 committees, and that if it is a member, it is made the chair most of the time. Specifically, the MoF chair or co-chair in 25 of 34 (74 percent) countries, and is the sole chair in 21 (62 percent) countries in which it is a member. Nonetheless, there are some variables that are significant in the CB as chair regressions, which we now turn to.

As shown in columns (A) to (D), the coefficients on CB as PR indicator are not significant, suggesting that information synergies from the CB as a PR are not an important factor for the CB as chair decision, as it was not for creating a FSC. The coefficients on CB as a wide PR are positive, however, but only marginally significant in one specification, which could suggest that information synergies or organizational efficiencies are not ignored entirely, but this result is not robust to alternative specifications (shown below in Table 10). Note that this result differs from Masciandaro and Volpicella (2016) who find, based on a smaller and more emerging-market oriented dataset, that a central bank with micro supervisory responsibilities for banks (where they do not consider a CB as a wide PR variable) is more likely to have a stronger role in financial stability. However, they do not distinguish between the CB as chair of a FSC or as a single authority, and we find different determinants for the two outcomes.

From a political economy perspective, we find that the coefficient on rule of law is positive and significant in most specifications, indicating a higher probability of the CB being chair of the FSC. This result could reflect that countries are concerned about excessive power, and allow central banks to be chairs where property and contract rights have stronger protections. We also find that the coefficient on the number of financial crises that an economy has experienced, *No. of crises*, is negative though also only marginally significant in the CB as chair regression, and positive but not significant in the MoF regression. We interpret these results as reflecting that the more likely that an economy is expected (at least by authorities) to experience a financial crisis that may involve substantial fiscal outlays, the less likely the CB should be chair since the MoF should be more directly involved. We do not find that a measure of CB political independence for monetary policy affects the likelihood that it will be the FSC chair.²¹

In terms of whether CB as chair reflects a motive to utilize its macro-based analytical skills, results are weak. The coefficient on *Credit-to-GDP* is positive and significant, indicating greater credit intensity increases the probability of the CB as chair of the FSC. Countries with more advanced financial sectors may have more volatile business cycles, and as a result CB expertise may be valuable, though the magnitude of the effect of credit intensity is very small.

Coefficients on the coefficient of variation of GDP and gross capital inflows-to-GDP are not significant. However, a country that is a WEO advanced economy with significant exports and global financial integration has a significantly lower probability that the CB is made the chair of the FSC. Coefficient estimates suggest the probability of a CB chair is only about 10 percent in a WEO advanced economy, and about 70 to 90 percent when the economy is not (depending on other indicator variables). Recall that the probability of the CB as single agency is substantially higher in a country that is a WEO advanced economy. But these results suggest that if a FSC were created in a WEO advanced country, and not to take advantage of CB's expertise in exchange rates and currency markets in macroprudential policy, they do not settle at some intermediate step by then giving the CB a leadership role. While these results are puzzling, they do not affect our results related to coordination or information synergies, though we plan to explore further.

Finally, Table 10 presents some robustness checks of regressions (3) and (4) for chair of FSCs. In particular, it considers the decision to designate the chair of FSC where all countries in the dataset are included. Essentially that means the regressions combine three decisions – formation of the FSC, membership of the FSC, and chair of the FSC. The results are largely similar to results in Table 9, suggesting that the factors that determine the chair of the FSC continue to be prominent even when other decisions are implicit in the regression.

²¹ This result for CB political independence differs from Masciandaro and Volpicella (2016), though we have a substantially larger dataset with less skew to emerging and developing economies. We also explored another measure of CB independence, specifically the measure developed by Cukierman et al. (1992) and updated to 2010 recently by Bodea and Hicks (2015), but still did not find a relationship with this measure.

6. Summary and Conclusions

We construct a new dataset of governance structures for financial stability in 58 countries that in the past have taken macroprudential policy actions. We are interested in governance structures' leadership, membership, and tools to evaluate the ability to take countercyclical measures to reduce potential systemic risks that might arise, for example, from rapidly rising house prices or persistently low interest rates. We show that 41 countries have a formal or defacto multi-agency financial stability committee as of 2016, and 14 countries have placed that responsibility with a single agency, the central bank. Most financial stability committees were created after the recent global financial crisis.

In terms of the entities responsible for financial stability, the central bank is almost always part of the governance structure, but it is not a dominant member and our empirical analysis suggests that committees are not set up especially to take advantage of its macroeconomic policy formulation skills. The central bank is the sole authority in 14 countries, and chair or co-chair of a committee in 18 countries, and it has authority to implement various time-varying macroprudential tools in more countries than the prudential regulators and financial stability committees. However, the ministry of finance is more often the chair of the financial stability committees, in 25 countries, though unlike the central bank, it is never the sole agency. Prudential regulators are on nearly all of the committees and have authorities for tools in many countries. But they are the co-chair in only one country, indicating that microprudential regulators are critical in the institutional set-ups for financial stability, but they are not in charge of macroprudential policies.

Most financial stability committees do not have new tools. Indeed, only two committees have hard time-varying tools, while 11 can issue "comply or explain" directives, and the authorities for CCyB, stress tests and LTVs predominately remain with the existing regulators. This structure indicates that most committees could not direct but would need to convince its members to use their tools to mitigate identified financial stability risks. In addition, regression results support a motive for setting up committees to enhance coordination across multiple agencies, and not to build on a central bank's skills when it is also a prudential regulator or skills developed for its monetary policy responsibilities.

These results combined suggest that many countries have established multi-agency committees to improve information sharing and coordination, but not to direct actions. An important benefit from committees stems from the potential to move policy actions of individual agencies away from a suboptimal Nash equilibrium outcome toward a more cooperative outcome. However, without independent tools, they may not be developing the analysis necessary for members to consider time-varying macroprudential policy options to achieve financial stability. 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 countries given uncertainty about how to calibrate macroprudential policies and their effectiveness. Relatedly, it may also reflect the intention not to give financial stability committees policy implementation authority, given the political unpopularity of any actions that a committee might take. But the risk of inaction and ineffectiveness seems high given the different mandates of the agencies – the prudential regulator, ministry of finance, and central bank – on the financial stability committees, and its lack of tools. 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.

In order to reduce a tendency to inaction, countries could take a number of steps short of granting committees independent tools (such as comply or explain powers) to promote more effective policymaking. One would be to clarify that all the members individually, not just collectively as a committee, have responsibilities for financial stability, since a common mandate would make coordination more effective (see Kohn, 2014). Another would be for financial stability committees to ask the central bank or prudential regulators that currently have the powers to set the CCyB, LTVs, and stress tests, to articulate frameworks ahead of time for the conditions that would prompt them to use the tools for macroprudential purposes, since again this would facilitate coordination and better focus information-sharing efforts. For example, in many countries, prudential regulators are the primary authority for stress tests, and may view them mainly to assess capital adequacy of individual institutions under stress rather than to meet macroprudential goals, such as preserving the capacity to lend in a recession. Another would be to create automatic mechanisms for financial stability committees to request tools from the government when needed, as in the U.K., rather than to just issue warnings about potential systemic risks. In addition, as in the U.K., such an expansion of authorities should be aligned with greater accountability to the public for actions to promote financial stability.

In terms of other avenues for further research, a key question is how differences in governance structures actually affect the use of tools. For example, would a ministry of finance chair make it more or less likely to raise LTVs in periods of rapidly escalating house prices, or would a stronger central bank role make it more likely to implement time-varying macroprudential tools or in a more-timely manner? Another important issue is the effectiveness of comply or explain directives, since they are a new independent tool. It may also be useful to assess whether communications by financial stability committees, through FSRs or other means, lead to better financial stability outcomes than previous FSRs. The governance measures developed in this paper should be useful for such analysis in the future, after more policy actions are taken with the new governance structures in place.

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Appendix A: Country coverage

Table A.1. Countries in our Dataset

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	

Appendix B: Recent Decisions to Raise the Countercyclical Capital Buffer

We examined decisions to increase the countercyclical capital buffer (CCyB) to gain insights into how the governance arrangements might affect actual decision making. We are especially interested in the role of the CB in the decision-making process given it has greater political independence and as well as more well-suited skills – relative to those of PRs or of MoFs – to act countercyclically. Only eight countries have raised the CCyB in recent years and these changes have been recent, so there are not enough observations to do formal empirical analysis of how committees might affect macroprudential decision-making performance, which could also control for other factors, such as credit growth and real estate prices. But the decision-making processes illustrate four interesting points regarding policy implementation and effectiveness that result from members having different skills and objectives.²²

The first two points are evident from Table 6, which shows that the macroprudential policy arrangements vary widely across the eight countries that have raised the CCyB above zero. First, FSCs are the macroprudential authority in six of the eight countries, but only in one country does it have the authority for the CCyB. Second, CBs have a more direct role than the FSC. They have either direct decision-making authority or a formal responsibility to provide analysis in all countries but one, Sweden. In Sweden, the CB provides analysis in its Financial Stability Report and makes a recommendation, but this recommendation does not appear to be part of a formal process and the PR chooses the level on its own. In 2015, the CB raised concerns about the process, and highlighted that it was important to clarify the macroprudential mandate of the PR (*Finansinspektionen*), in order to reduce financial stability risks.

It is important that action is taken as soon as possible to strengthen resilience to shocks and counteract the risks relating to high household indebtedness. However, it has become apparent that Finansinspektionen does not have a sufficiently clear mandate or clearly-defined tools to take macroprudential policy measures. This lack of clarity is delaying and hindering the introduction of necessary measures. It is therefore of the utmost importance that Finansinspektionen's mandate and instruments for macroprudential policy are clarified in law as soon as possible.²³

Third, in three countries, Norway, Sweden, and Switzerland, there are clear indications that the CBs had wanted the CCyB to be larger or put in place more quickly than did either the PR or the government, at least initially. The narratives below highlight this tension, and the examples of

²² A recent Basel Committee on Banking Supervision paper (BCBS, 2017) surveys and provides a broad scope of information about CCyB policymaking practices in BCBS member countries. This paper also documents different CCyB authorities across BCBS member countries, but does not consider implications of governance structures or any of the other facts about countries' CCyB policy actions or frameworks that this paper documents.

²³ Sveriges Riksbank Financial Stability Report, 2015:1, p. 1.

Sweden and Switzerland also suggest that PRs might prefer more traditional tools like higher risk weights to CCyB.

In Norway, the CB makes a recommendation to the MoF, which chairs the de facto financial stability committee. The CB provides its analysis in its Monetary Policy Report, and states that it exchanges information and assessments with the PR in conducting its analysis. The CB recommended in December 2013 that the CCyB be raised to 1 percent, given rising house prices and mortgage debt in the country. The MoF agreed with the recommendation, but allowed banks 18 months rather than the typical 12 months to come into compliance. In a press release in December 2013 the MoF stated,

The Ministry of Finance has today decided that the level of the countercyclical buffer should be 1 per cent from the 1st of July 2015. Norges Bank has given advice that the level of the buffer should be 1 per cent. The Financial Supervisory Authority has stated that it concurs with the advice... Norges Bank has advised that the requirement shall be effective as of the 1st of January 2015. – I have decided to give banks more time to meet the new requirement. The countercyclical buffer will therefore be effective as of the 30th of June 2015, says Minister of Finance Siv Jensen.²⁴

The CCyB in Norway was raised again in 2016 and 2017, with the MoF doing the same as what the CB recommended.

In Sweden, as noted above, the PR has the authority to set the CCyB and the CB has no formal role. The CB published in its Financial Stability Report that it believed the CCyB should be set at a higher level of 2.5 percent when the PR had raised the CCyB to 1 percent in 2014.

The Riksbank welcomes Finansinspektionen's decision to activate the countercyclical buffer and finds that this is justified in light of the increased systemic risks and with the purpose of strengthening the resilience of the banks. However, the Riksbank is of the opinion that the countercyclical buffer rate should be set at 2.5 per cent. This is because of the developments on the housing market in recent years as well as the high and growing indebtedness in the Swedish household sector. Furthermore, the Riksbank does not share Finansinspektionen's view that measures addressing structural systemic risks, such as an increase in the risk weight floor, justify setting the buffer rate at a lower level than the buffer guide because such measures serve different purposes in macroprudential policy. Finally, the Riksbank finds that it would be desirable to have a shorter phasing-in

²⁴ <https://www.regjeringen.no/en/aktuelt/countercyclical-buffer-at-1-pct/id747825/>

period than 12 months. The fact that credit has increased sharply over a lengthy period of time could provide specific grounds for this.²⁵

Switzerland's arrangement is one where the authorities share responsibilities for financial stability and work jointly to implement macroprudential policies. The government (Federal Council) has the authority to set the CCyB, with a proposal by the CB and after hearing the views of the PR. Financial stability risks arising from residential housing markets had been highlighted as early as 2010 in the CB's financial stability report. As described by Danthine (2016), the authorities took several measures between July 2012 and September 2014 to reduce financial stability risks linked to the residential housing market, but the PR favored self-regulation by the banks or higher risk weights to the countercyclical capital buffer.²⁶ After raising the CCyB, there were closer and more interactive discussions about systemic risk between the CB and PR, and a further increase in the CCyB one year later had approval from the PR.

The first set of measures in 2012 indeed included the legal basis for the activation of the CC(y)B, a decision that was to be taken by the Federal Council under proposal of the SNB and after hearing the view of the FINMA. Opposition to this development was strong among banking circles and it may be said that the FINMA was not enthusiastic either with the possibility that the SNB could become more active – or active beyond moral suasion – in this area.

... measures ... adopted by the FINMA in January 2013 ... consisted in an increase in the risk weights applied to riskier mortgages (mortgages with a LTV in excess of 80%). Consistent with the above interpretation, the FINMA, however, simultaneously opposed the proposition of the SNB to activating the CC(y)B at the level of 1%, a proposal which was nevertheless adopted by the Federal Council in February 2013.

Fourth, the analysis provided by CBs all included the credit-to-GDP ratio and a gap based on the BCBS methodology, but most suggested that the gap estimations might not accurately capture credit conditions in their country. The wide range for the credit-to-GDP ratios and gaps at the time of the first time the CCyB is raised suggest that considerable analysis and judgment is needed. Most CBs offered alternative measures of the gap and supplemented the analysis with other measures, such as credit growth, lending standards, and real estate prices. This type of analysis is highly aligned with the macro-based economic and financial skills more likely found at CBs, rather than at PRs.

²⁵https://www.esrb.europa.eu/pub/pdf/other/140910_Decision_memorandum_CCB_Sweden.pdf?4ed26e2358ae71830daedadb070dce1f

²⁶ <http://voxeu.org/article/macropnu-policy-switzerland>

In addition to illustrating the relatively important role of the CB to the FSC, and different objectives of agencies when setting macroprudential policies, the above examples suggest that conflicts were generally ironed out over time. Thus, it may be that a number of alternative arrangements can work, as long as processes or routines are in place to mitigate conflicts. This may be the situation in Iceland, although in this case, we did not find evidence of conflicts despite the potential for tensions since the PR has the authority to set the CCyB in that country yet a different group – the country’s FSC – makes the recommendation on the policy. One possible reason for the lack of tensions is that the group that makes the initial recommendation, Iceland’s FSC, includes members of both the CB and PR, and thus any recommendations likely already incorporate any differences in views across agencies. Overall, these examples suggest different arrangements may work out eventually. It also suggests, however, that monetary policymakers should not view FSCs as entities that will take actions, like monetary policy committees can.

Table 1. Financial Stability Committees (FSCs) and Single Macroprudential Authorities

FSC or Single Agency	Year FSC formed	Chair or co-chair of FSC ^(a)	No. of agencies that vote on FSCs
(A)	(B)	(C)	(D)
FSC:			
Formal	41	≤2008	11
	34	2009	1
DeFacto	7	2010	5
		2011	3
Single Agency:	15	2012	3
Central Bank	14	2013	10
CB is a PR	14	2014	4
Prudential Regulator	1	2015	4
Informal	2		
Total	58	Total	41
			Total
			41

(a) Sums to more than 41 because for three committees the central bank and ministry of finance are co-chairs and for one committee the central bank and prudential regulator are co-chairs.

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

Table 2. Roles of Agencies

	Central Bank (CB)	Ministry of Finance (MoF)	Prudential Regulator (PR)	
			Independent PR	Part of CB
Agency is a single authority	14	0	1	14
Agency is a FSC sole-chair	12	21 ^(d)	0	7
Agency is a FSC co-chair	6 ^(a)	4 ^(e)	1	3
Agency is a FSC member but not a co-chair or sole-chair	22 ^(b)	9 ^(f)	20 ^(h)	10 ⁽ⁱ⁾
Agency is part of an informal FSC	2	2	1	1
Agency is neither on a FSC (formal or informal) nor the single agency	2 ^(c)	24 ^(g)	0	0
Total	58	58	23	35

- (a) In three cases it is co-chair with the MoF; in one it is co-chair with the PR; and in two the chair rotates.
- (b) In 20 cases the MoF is chair (21 minus the country where the CB is not on the FSC); and in two cases there is no chair.
- (c) In one case the CB is not on a FSC; and in one case an independent PR is the single agency.
- (d) Includes the case for Russia where the First Deputy Prime Minister is chair.
- (e) In three cases it is co-chair with the CB; and in one case it rotates.
- (f) In eight cases the CB is chair; and in one case there is no chair.
- (g) In seven cases the MoF is not on the FSC; in 14 cases the CB is the single agency; and in one case an independent PR is the single agency
- (h) In five cases the CB is sole chair; in 12 cases the MoF is sole chair; in two cases the CB and MoF are co-chairs; and in one case there is no chair
- (i) In nine cases the MoF (including for Russia where the First Deputy Prime Minister) is chair; and in one case there is no chair

Table 3. Authorities for Tools

FSC Tools	Authority for the CCyB	Authority for stress tests^(a)	Authority for LTVs
(A)	(B)	(C)	(D)
Soft only	30 NO	5 YES	0 NO
Semi-hard or hard	11 YES	53 If YES: FSC Central Bank CB is a PR Prudential Regulator Ministry of Finance ^(b)	57 YES If YES: FSC Central Bank CB is a PR Prudential Regulator Joint CB and PR Ministry of Finance
Hard	2		19 39 1 22 21 7 9

(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 LTV ratios.

Table 4. Central Bank Authorities

	CB is single authority	CB is FSC sole-chair	CB is FSC co-chair	CB as neither	Total
Total	14	12	6	26	58
CB is a PR	14	7	3	11	35
CB is a wide PR	9	4	0	5	18
CB is not a PR	0	5	3	15	23
FSC tools:					
Hard tools	--	3	1	--	4
CB tools:					
CCyB	13	6	3	9	31
LTVs	9	3	2	8	22
Stress tests	14	9	3	13	39

Table 5. Role of Central Bank for FSCs and Macroprudential Policymaking

<p>Arguments in favor of a stronger role</p> <p><i>Information synergies</i> Central bank expertise from other responsibilities, including being the lender of last resort for financial firms, operating the payments system, and – for some central banks – being the prudential regulator. [Nier, Masciandaro and Volpicella, Tucker].</p> <p><i>Skill advantage in time-varying analysis</i> Central bank has expertise in</p> <ul style="list-style-type: none"> • Monitoring macroeconomic and financial conditions over time (i.e., filtering signal from noise) • Analyzing and assessing the broader systemic implications of identified vulnerabilities, derived from its monetary policy responsibilities • Communicating potential risks that may require a policy response. <p>Required skills are more similar to monetary policy than microprudential supervision [Nier, Tucker]</p> <p><i>Consistency advantage</i> Greater consistency and coherence in using a range of tools in a single entity [Nier]</p> <p><i>Independence</i> Independent authority and thus better able to set countercyclical policies that are unpopular [Tucker]</p>
<p>Arguments in favor of a weaker role</p> <p><i>Power.</i> Central bank already is an independent monetary authority, and would have too much power [Masciandaro and Volpicella, Nier, Tucker]</p> <p><i>Responsibilities.</i> Central bank 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, Tucker].</p> <p><i>Inappropriate.</i> Would inappropriately give unelected officials authority for policies with distributional effects [Nier, Tucker]</p> <p><i>Undermine monetary policy mandates.</i></p> <ul style="list-style-type: none"> • A leadership role also for financial stability could undermine its commitment to monetary policy objectives, which could lead to higher inflation [Masciandaro and Volpicella, Tucker, Ueda-Valencia]. • Could threaten monetary policy independence if leads to additional government scrutiny (Tucker) or if crises result and the central bank loses credibility (Smets).

Table 6. Decisions to Raise the Countercyclical Capital Buffer

	Authority for CCyB	Macropru Authority	FSC Chair	Role of Central Bank	Date of first raise	Credit-to-GDP ratio at first raise	Credit-to-GDP gap at first raise ^(b)
With FSCs							
Hong Kong	CB	FSC	MoF	CB sets the CCyB on its own	Jan 2015	289	44
Iceland	PR	FSC	MoF	CB prepares the analysis for the FSC via a committee with CB and PR membership; FSC recommends the level of the CCyB to PR	Mar 2016	170	< 2
Norway	MoF	Defacto FSC	MoF	CB recommends the level of the CCyB to the MoF; CB exchanges assessments with the PR; PR can also make a recommendation to the MoF	Dec 2013	221	-3
Sweden	PR	FSC	MoF	CB provides analysis and recommends the level of the CCyB to PR in FSR, but PR makes the decision ^(a)	Sep 2014	233	-4
Switzerland	Govt	Defacto FSC	Joint CB and PR	CB recommends the level of the CCyB to the government; PR also makes a recommendation	Feb 2013, targeted at residential mortgages	207	13
United Kingdom	FSC	FSC	CB	CB prepares analysis and recommends the level of the CCyB to the FSC ^(a)	Mar 2016	159	-26
With CB single							
Czech Republic	CB	CB single	CB	CB sets the CCyB on its own ^(a)	Dec 2015	76	3
Slovakia	CB	CB single	CB	CB sets the CCyB on its own but consults with the ECB systemic risk council ^(a)	Jun 2016	85	-3

(a) ECB can mandate a higher CCyB.

(b) Credit-to-GDP gap based on BIS estimates with a one-sided HP filter, lambda equal to 400,000.

Table 7. Sample Characteristics

	N	Mean	Standard deviation	10 th percentile	90 th percentile
CB as PR indicator	58	.60	.49	0	1
CB as wide PR	58	.31	.47	0	1
Rule of law	58	.81	.91	-.54	1.85
WEO Advanced	58	.48	.50	0	1
No. of crises	58	1.14	.76	0	2
CB's no. of macropru tools	58	1.64	1.2	0	3
CB Political independence	58	.63	.30	.25	1
Log(GDP)	58	26.4	1.5	24.4	28.6
CV GDP	58	.17	.05	.11	.26
Credit-to-GDP	58	91.8	53.7	29.5	171.9
Log(CV capital inflows-to-GDP)	58	-.17	.54	-.69	.47

Table 8. Probability of a FSC Established and Probability of CB as Single Agency

	FSC Established Sample all countries				CB as Single Agency Sample for CB is a PR		
	(A)	(B)	(C)	(D)	(E)	(F)	(G)
CB a PR Indicator	-1.40	-.78	-1.63	-1.26	--	--	--
CB as wide PR	-2.14**	-2.21**	-2.16**	-2.24*	2.55*	2.52*	2.15*
Rule of law	1.64**	1.65**	1.23	1.46*	-1.13	-1.12	-0.57
No. of crises	-.24	-.32	-.52	-.55	.57	.51	1.31
CB's no. of macropru tools		-.29					
CB's political independence			1.14	.86		.33	1.15
Log(GDP)	1.15**	1.18***	1.16**	1.59***	-1.31*	-1.29*	-1.58**
CV GDP	6.59	7.82	8.32	5.49	-7.76	-6.26	0.01
WEO Advanced	-3.99**	-4.12***	-5.82**	-6.86***	3.70*	3.76*	4.15**
Credit-to-GDP			.023*	.03*		-.00	-.00
Log(CV capital inflows -to-GDP)				.70			-.94
Constant	-27.6**	-28.2**	-28.3**	-39.97***	32.4*	31.5*	37.5*
N	58	58	58	57	35	35	34
Pseudo R2	.33	.33	.39	.42	.26	.26	.28

Table 9. Probability of CB as Chair of FSC and Probability of MoF as Chair of FSC, Based on FSC Membership

	CB as FSC Chair Sample: FSCs with CB membership				MoF as FSC Chair Sample: FSCs with MoF membership			
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)
CB a PR Indicator	-.69	-1.86	-1.09	-.99	.05	-1.76	.13	.19
CB as wide PR	2.12*	2.38	2.44	1.72	-1.96	-2.11	-1.99	-2.06
Rule of law	2.81**	3.07**	2.71*	1.67	-.10	.15	.18	.89
No. of crises	-1.38*	-1.37*	-1.61	-1.96	.65	.95	.69	.85
CB's no. of macropru tools		.65				1.07		
CB Political independence				3.23				-.06
Log(GDP)	.15	.16	.28	.12	.23	.25	-.19	.45
CV GDP	-6.23	-8.80	-11.98	-3.96	6.89	.00	6.95	7.99
WEO Advanced	-6.13**	-6.25*	-8.55**	-7.37**	2.20	3.07	2.55	1.48
Credit-to-GDP			.02*	.04**			-.00	-.01
Log(CV capital inflows -to-GDP)				-1.89				1.71
Constant	-1.93	-2.29	-5.40	-5.41	-8.24	-9.18	-7.25	-14.16
N	40	40	40	39	34	34	34	33
Pseudo R2	.32	.33	.40	.46	.23	.29	.24	.28

Table 10. Probability of CB as FSC Chair and Probability of MF as FSC Chair, All Countries

	CB as FSC Chair Sample: All countries			MF as FSC Chair Sample: All countries		
	(A)	(B)	(C)	(D)	(E)	(F)
CB a PR Indicator	-.20	-.35	-.52	-.52	-.50	-.44
CB as wide PR	-.44	-.15	-.47	-1.50	-1.51	-1.42
Rule of law	2.02**	2.03**	1.96	.67	.76	.87
No. of crises	-.98	-1.24*	-2.34*	.51	.51	.41
CB's no. of macropru tools						
CB Political independence			4.11*			.64
Log(GDP)	.35	.43	.59	.32	.32	.47*
CV GDP	-2.56	-7.12	1.06	5.25	5.84	5.91
WEO Advanced	-4.03**	-6.56***	-7.99***	.27	.41	-.12
Credit-to-GDP		.03**	.04***		-.00	-.00
Log(CV capital inflows -to-GDP)			-.61			.94
Constant	-8.82	-11.74	-19.43*	-10.67	-10.74	-14.66
N	58	58	57	58	34	57
Pseudo R2	.20	.32	.39	.18	.24	.20