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New Financial Stability Governance Structures and Central Banks

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Abstract

We evaluate the institutional frameworks developed to implement time-varying macroprudential policies in 58 countries. We focus on new financial stability committees (FSCs) that have grown dramatically in number since the global financial crisis, and their interaction with central banks, and infer countries' revealed preferences for effectiveness versus political economy considerations. Using cluster analysis, we find that only one-quarter of FSCs have both good processes and good tools to implement macroprudential actions, and that instead most FSCs have been designed to improve communication and coordination among existing regulators. We also find that central banks are not especially able to take macroprudential actions when FSCs are not set up to do so. We conclude that about one-half of the countries do not have structures to take or direct actions and avoid risks of policy inertia. Rather countries' decisions appear to be consistent with strengthening the political legitimacy of macroprudential policies with prominent roles for the ministry of finance and avoiding placing additional powers in central banks that already are strong in microprudential supervision and have high political independence for monetary policy. The evidence suggests that countries are placing a relatively low weight on the ability of policy institutions to take action and a high weight on political economy considerations in developing their financial stability governance structures.

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1. Introduction

Since the global financial crisis, countries have been strengthening their microprudential policy regimes and 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 across a wide range of 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.

In this paper, we present new evidence on the institutional and governance structures for macroprudential policies. Institutional design is especially important for macroprudential policies because, in contrast to microprudential policies, macroprudential policies consider financial risks that can span many types of financial intermediaries, as well as interactions between the financial system and the real economy. In addition, time-varying macroprudential policies are expected to build resilience in anticipation of possible future shocks, not in response to current shocks, and so need to be preemptive. As a result, effective implementation should involve mechanisms to cover the broad financial system, and to avoid the risk of policy inertia. As emphasized by Peter Conti-Brown in describing the Federal Reserve, "*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*." (2016, p. 26).

We build a dataset of financial stability governance structures for 58 countries from official sources that are available to the public, updated through mid-2018. We document a dramatic growth in multi-agency financial stability committees (FSCs) since the global financial crisis (figure 1). Only 11 countries had FSCs for macroprudential purposes in 2008, whereas 47 countries had FSCs in 2018. Over that same period, no countries created a new single regulatory agency with sole authority for macroprudential policies. This dramatic growth in FSCs indicates it is important to understand the role of these committees in implementing macroprudential policies.

There are several reasons for why multi-agency committees would be an effective governance structure for macroprudential policy. Prudential regulators should be involved since most policies will affect and be put into effect through regulated financial institutions. Central banks should be involved for their expertise in macroeconomic forecasting and in setting countercyclical monetary policy given they have some degree of operational independence for setting monetary policy. Elected officials could also have a role since macroprudential policies that are viewed as having elements of credit allocation, which would raise political economy considerations. For example, there may be a tradeoff between expanding homeownership and reducing rapid mortgage debt growth, by tightening loan-to-value ratios or raising the countercyclical capital buffer.

International organizations usually advocate for a prominent role for central banks. Central banks are designed to have longer time horizons than politicians or market participants and are therefore more

willing to bear the near-term costs of policies when gains may not be realized within an election cycle. For example, the IMF argues central banks foster policy coordination between macroprudential and monetary policy and can "help shield macroprudential policy from political interference that can slow the deployment of tools" (2014, p. 34). The ESRB recommends that "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 responsibilities in the area of financial stability" (2011, p.2).

But there also are potential costs of prominent roles for central banks. Excess concentration of power in unelected officials is a principal concern (Goodhart, 2010, Tucker, 2014, 2016). In evaluating the changing responsibilities of central banks following the crisis, Goodhart (2010) writes that the "*combination of operational independence to set interest rates and liquidity management together with prospective macroprudential regulation just vests too much power in a non-elected body*."[1] Tucker (2014, 2016) also argues that while central banks have the skills and the independence, institutional structures should have a role for elected officials because macroprudential policies may affect credit cycles or have important distributional consequences. In contrast, the IMF has raised concerns about a prominent role for elected officials because it could risk delaying macroprudential actions and compromise the independence of regulatory agencies and the central bank that serve on the same committee (2014, p. 35).

We evaluate the institutional structures for macroprudential policy that exist in the 58 countries in our sample in light of these rationales and ultimately with a goal to determine their effectiveness to implement time-varying macroprudential policies. We document the institutional arrangements. No FSC exists in 11 of the 58 countries in our sample, which are mostly smaller countries, and instead either the central bank or the prudential regulator is designated the macroprudential authority. A FSC exists in 47 countries, and both prudential regulators and central banks are on all but one, consistent with a coordination motive. The ministry of finance, representing the elected government, is a formal member of all but a few FSCs, and is an informal observer in other FSCs where it is not a formal member. Moreover, the ministry of finance is more often the chair of the FSC than the central bank, suggesting countries value strengthening the political legitimacy for setting macroprudential policy and coordination across agencies. In any case, political leadership relative to a central bank leadership suggests a greater tendency to delay actions.

While most countries have established FSCs, they have generally not made significant changes to how the country would take macroprudential policy actions. Only three FSCs can directly implement countercyclical policies, and these three and ten 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] Instead, most

[1] Elliot, Feldberg, and Lehnert (2013) in their survey of the United States' historical use of cyclical macroprudential policy tools document similar views being expressed with regard to the powers that could be given to the Federal Reserve – at the request of the President – under the 1969 Credit Control Act (2013, p. 15 to 17). For example, they note the 1969 Joint Economic Committee Republican minority view concerning the Act that "If fully invoked, it would be heady power for the Fed – complete credit control over all of our economy, nonbanking as well as banking institutions …"

[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

FSCs are either advisory – with the ability to issue warnings and non-binding recommendations but without the ability to take or direct actions of the member agencies – or operate purely to facilitate information sharing, communication, and policy coordination across agencies.

We use logit analysis to examine the probability a country creates a multi-agency FSC, and find that FSCs are more likely in larger countries and less likely in countries where the central bank is also the prudential regulator for banks and other parts of the financial sector. These results suggest that better communication and coordination is a main motive for creating FSCs since larger countries with more regulators will have more interested parties to coordinate. To provide additional insight into a country's decision to set up a multi-agency FSC, we look only at those countries where the central bank is also a prudential regulator, and find that the same factors determine the decision. We find that a central bank – rather than a FSC – is more likely a macroprudential authority in smaller countries and when the central bank is a regulator for a broader swath of the financial system, and when there are likely to be fewer regulators to coordinate.

Given the various characteristics of FSCs, we use cluster analysis to group countries according to the ability of their institutional structures to take actions. We find a cluster of 12 FSCs that appear to be designed to effectively take or direct actions, based on whether the FSC is formal, has a chair, a voting process, or tools to take actions. But 23 FSCs, almost half, lack two or more of these basic features, indicating they are less effective. We document that the 12 FSCs that are "more able" are in countries that are wealthier, have more developed financial sectors, stronger rule of law, and more checks and balances for government actions. These indicators suggest the more effective FSCs are set up in countries with the resources and infrastructure to do so.

Given that many countries lack effective FSCs, we then look at whether this might reflect that countries have another agency, with the macro expertise and independence to overcome policy inertia and be an effective macroprudential authority, namely the central bank. We find a distinct cluster of 18 central banks that do not have macroprudential authorities – based on the fact that they cannot set the countercyclical buffer (CCyB) or loan-to-value ratios (LTVs) – and are not a prudential bank regulator or a prudential regulator for more than banks. However, there is less clarity about a distinct cluster of strong macroprudential-oriented central banks. Instead, central banks that already are broad prudential regulators and have more political independence for monetary policy are not likely to be able to set LTVs, and those that are able to set LTVs are not a broad microprudential regulator. These characteristics are consistent with political economy considerations to not place multiple powers into a central bank. In addition, in a cross-tabulation of the CBs and FSCs, we do not find an inverse relationship between weaker FSCs and more able macroprudential CBs, suggesting many countries lack effective macroprudential authorities.

Our study is the first to focus specifically on the FSCs that have become very prevalent since the global financial crisis. It sheds light on countries' revealed preferences for creating FSCs that can more effectively implement policies versus political economy considerations, such as coordinating among existing regulators, avoiding concentration of power for financial policies in an independent central bank,

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.

and potential conflicts between macroprudential policies and other social objectives. We infer from the choices of structure, governance, and tools of institutional structures how countries value the competing considerations for implementing macroprudential policies.

Our results suggest that an effective policy implementation motive is supported by decisions to establish FSCs with both processes and good tools in one-quarter of the countries with FSCs, as well as decisions to designate a sole central bank authority in nine countries that are smaller and have fewer financial regulators. But most countries with FSCs appear to establish them mainly to facilitate information sharing and improve communication and coordination among agencies rather than to implement policies, and tools are controlled by the agencies raising issues about whether there is clear accountability among agencies and FSCs for financial stability. Moreover, we do not find evidence that central banks are especially able to take macroprudential actions when FSCs are not set up to do so, suggesting that institutional structures are not in place in many countries to effectively implement time-varying macroprudential policies. Rather countries' decisions appear to be consistent with preventing placing additional powers in central banks that already exercise independence in microprudential supervision and monetary policy.

Finally, we document an increased and substantial role of the political sector into macroprudential policymaking. While this greater role may reflect that objectives of macroprudential policies, such as to reduce credit growth, may come into conflict with other social objectives, it also suggests that many institutional arrangements are not set up to take unpopular actions and reduce the risk of policy inertia or inaction that can arise with time-varying macroprudential policies. An important implication of these results is that central banks when setting monetary policy should not assume that macroprudential authorities can also exercise independence.

We first review existing studies on best practices for implementing time-varying macroprudential policies and competing political economy considerations in section 2. We then describe the key characteristics of the institutional arrangements of macroprudential authorities in 58 countries, focusing heavily on the membership, leadership, and tools available to implement policies of FSCs in section 3. We present results from logit analysis of the decisions to establish FSCs, and cluster analysis for the ability of FSCs and central banks to take macroprudential policies in section 4. Section 5 concludes.

2. Ability to implement macroprudential policies

The ability to implement macroprudential policies depends on the governance structure and the available tools of the responsible authorities. For this paper, we are interested in macroprudential policies that involve the dynamic adjustment of the parameters of financial regulatory policies, which combined with structural requirements such as enhanced capital standards, can reduce the economic costs of recessions and financial crises. While the arrangements to implement structural macroprudential policies are tied closely to existing microprudential regulators, the governance framework for time-varying macroprudential policies is new and less well-established. Given the increased prevalence of multi-agency FSCs, we look at whether FSCs appear to be set up to implement policies or to foster communication and coordination across agencies. We then infer from countries' decisions about FSC structures and central bank (CB) authorities whether the institutional framework can overcome the risk of

policy inertia or inaction, and whether authorities and tools are aligned in a way to enhance accountability and effectiveness.

To assess best practices for governance, we draw on existing research about governance of financial policymakers. There is a general recognition that financial prudential regulators (PR) should have operational or instrument independence (though not necessarily political or goal independence) and their resources should not be subject to appropriations (Basel Core Principles of Effective Bank Supervision). Those principles should also be relevant for implementing macroprudential policies. The ESRB's guidance to countries on their macroprudential policy framework emphasizes the authorities should be shielded against outside pressures through independence.[3]

For CBs and monetary policy, the key issue in governance is how it can solve the time-inconsistency and inflation bias problem. In this case, the problem is that politicians have a preference for pushing the unemployment rate below its natural rate, perhaps because it makes them more likely to win elections (Kydland and Prescott, 1977; Barro and Gordon, 1983; Fischer, 1995). A CB that in setting monetary policy is heavily influenced by politicians would try to achieve this by generating more inflation than wage earners had expected (because doing so will mean that real wages will be lower and firms will employ more workers, unemployment rate will be lower than its natural rate). But inflation expectations are not fixed and the public would adjust upward their inflation expectations knowing that politicians have this incentive. As such, a CB heavily influenced by politicians will end up with higher inflation expectations and higher inflation – and thereby an upward inflation bias – without the benefit of fewer unemployed workers. An empirical negative correlation that has been documented for advanced economies between a CB's operational independence and inflation provides empirical support for CBs that are independent of political officials as a best practice for monetary policy (Arnone et al., 2007). For time-varying macroprudential policy greater political influence would lead policymakers to permit more buoyant financial conditions and higher levels of financial system vulnerabilities given that such developments would likely accompany lower unemployment rates. The public would expect this, though it is not clear that this expectation would obviate the effects on the unemployment rate as increased inflation expectations do for monetary policy.

Balls et al. (2018) offer a proposal for implementing macroprudential policy which builds from the governance for setting monetary policy. CBs have operational (instrument) independence but not political (goal) independence for monetary policy (there is political accountability in terms of mandate-setting, appointment of officials, and delegation of tools). A similar framework could be the basis for effective macroprudential policy. A committee chaired by the government, represented by the ministry of finance (MoF) could be responsible for identifying risks to financial stability and setting the priorities (or goals) for macroprudential policy. The CB bank would be operationally independent and responsible for setting policies (that is, using its macroprudential policy tools) to achieve a desired degree of financial stability set by the government. The two bodies would allow financial stability goals to be decided by politicians, providing legitimacy and accountability, and implementation by the CB would be more insulated from short-term political pressures and therefore mitigate policy inertia. Moreover, the CB is positioned to internalize tradeoffs between monetary and macroprudential policies.

[3] See ESRB/2011/3 (link: https://www.esrb.europa.eu/pub/pdf/recommendations/2011/ESRB_2011_3.en.pdf)

However, there are arguments that greater involvement of CBs into macroprudential policy would compromise the ability of the CB to achieve its monetary policy objectives. In particular, the incentives of a CB that makes simultaneous monetary policy and macroprudential decisions can be distorted because of time-inconsistency and political pressures (see Ueda and Valencia, 2012, and Smets, 2014). Policymakers in this setting minimize a quadratic loss function for inflation and output variability, augmented with a loss term for leverage variability.[4] 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 inflate away debt. Knowing this, macroprudential policy will be lax, which will lead to higher optimal debt and again an upward inflation bias.

Smets (2014) argues that these time-inconsistency risks can be mitigated if there are separate objectives, instruments, communications, and accountability for price stability and financial stability, and there is information sharing between the two bodies. Another argument in favor of separating policies is that since crises cannot be eliminated despite good policymaking, the actual occurrence of a crisis could compromise the credibility and, in turn, independence, of the CB.

Clearly, there are arguments on both sides for the role of the CB as the macroprudential authority or as a member of a multi-agency committee. In this paper, we document the institutional structures that countries have adopted to meet new responsibilities. We update and expand results from an earlier study based on a 2010 survey (Nier et al., 2011), and we focus heavily on new multi-agency FSCs given their dramatic rise since that earlier study, rather than the role of the CB.[5] Most previous papers have assumed that a stronger role for the CB, either as the main macroprudential authority or as a chair of a FSC, implied a more effective structure for macroprudential policies (see Lim et al., 2013, Mosciandaro and Volpicello, 2016, and Lombardi and Siklos, 2016). Below we look also at the combination of membership, leadership, and tools to evaluate the strength of the institutional structure.

There is mixed empirical evidence on benefits from a CB also having banking regulatory and supervisory authorities. Nier et al. (2011) find that the group of countries with close integration between CB and banking supervisory agencies have lower costs, in terms of failed banking assets, capital injections, and guarantees, than countries with separate arrangements. Goodhart and Schoenmaker (1995) found that there were significantly lower actual and expected bank failure rates in the 11 countries with an integrated

[4] 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).

[5] They catalog existing structures by five criteria: (i) the degree of institutional integration between CB 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.

regime than in the 13 countries with a non-integrated regime for a sample of 104 large bank failures in the 1980s to early 1990s. Merrouche and Nier (2010) found that the buildup of banking imbalances (measured by the ratio of loans to deposits) was less severe where the CB had full control of supervision and regulation. However, Koetter, at al. (2014) finds no improvement in the credit risk or non-performing loan ratio at banks when the CB is also the PR in 44 countries. None of these studies focus on the effects of CB interaction on the financial condition on the entire financial system. Lim et al. (2013) looks at the strength of institutional arrangements for macroprudential policy on how quickly actions are taken to moderate credit growth from 2008 to 2011 for a sample of 39 countries. 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. However, they focus on the strength of the CB without considering the role of the FSC as an authority.

3. 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 appendix A), which is current as of June 2018. A brief outline of how we collected our data is provided in the first subsection and findings are described in the subsequent four subsections.

a. Sample and data sources

We started with the sample of 64 countries in the macroprudential policy tool database of Cerutti et al. (2016) that are identified as countries having used macroprudential policies in a time-varying way. We dropped seven countries from their sample because of limited information about the use of tools or governance structure (as highlighted in Cerutti et al.), but kept Saudi Arabia in order to preserve the full set of G-20 countries. We also added Cyprus, not in the Cerutti et al. database, in order to include the full set of EU countries. Note that 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. As we document in subsections 2.b and 2.c, there is considerable heterogeneity in governance structures across these countries, so this treatment does not bias the results. Our process ultimately results in a sample of 58 countries, of which 28 are advanced economies and 30 are emerging market or developing economies, as categorized Arnone and Romelli (2013), which are consistent with the IMF's 2007 WEO report.[6] This sample includes a significantly higher share of advanced economies than previous studies of macroprudential authorities (e.g, Lim et al., 2013).

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

[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 near the beginning of the global financial crisis and right before most new structures were beginning to be formed.

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 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 is the very recent nature of financial stability governance structures, which in turn means continued ongoing changes in these structures. Indeed, some changes have occurred as recently as the past year and since the first draft of our paper.[8] Building this database ourselves by drawing on national authority websites also allows us to apply a consistent categorization of governance structure characteristics across countries, which is not the case with self-reported survey responses.

b. Financial stability committees

We find that 47 of the 58 countries have formal or de facto financial stability committees (FSCs), and 11 countries do not have FSCs (see figure 2 and table 1). Of the 47 countries with FSCs, 35 countries have a FSC that has been created formally by legislation and 12 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 11 countries that do not have formal or de facto committees, all have assigned, at least in practice, macroprudential responsibilities to an existing agency, and of these, nine countries have the central bank (CB) as the macroprudential authority and two countries have the PR.[9] These two cases are Peru and Finland, for which the PR is separate from the CB.

As we noted earlier there is considerable heterogeneity in governance structures across euro area countries, so that treating them as separate countries in our analysis does not bias the results. For example, with regard to whether euro area countries have a FSC, of the 19 in our sample, 14 have a formal or de facto FSC. Of the five that do not have formal or de facto committees, four have assigned macroprudential responsibilities to the CB and one has assigned it to the PR.

Even as FSCs have become more prevalent, their importance in terms of global activity is even greater since they tend to be more likely in the larger economies. When we weight FSC by economy size (real GDP), nearly all of the collective GDP of the 58 countries would be in the countries with FSCs (see figure 2). In particular, the 47 countries with FSCs account for 97 percent of the GDP of the 58 countries combined. That also means that the 11 countries without a FSC account for a very small share, 3 percent, of collective GDP.

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[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] Since the first draft of our paper was written in 2017, Cyrus, Ireland, Israel, and Saudi Arabia have formed FSCs, while China and South Africa have changed the precise forms of their FSCs.

[9] The nine countries for which the CB is the macroprudential authority are Argentina, Belgium, Czech Republic, Greece, Hungary, Lithuania, New Zealand, Singapore, and Slovakia. Note that in the paper we denote the CB that is also a PR as a CB.

A few of the 11 countries do not have a FSC and have made an existing agency responsible for macroprudential policy, nonetheless these countries' have informal information sharing and coordination arrangements in place among agencies. To our knowledge there are four such countries. In three – Belgium, New Zealand, and Singapore – of these four countries, informal arrangements exist between the CB, which is the authority with macroprudential responsibilities, and the MoF, indicating they do not act solely on their own. For example, in Belgium, the MoF needs to approve regulation for financial stability that is issued by the CB. Indeed, in Belgium the MoF rejected regulation to raise risk weights on some loans (according to the risk profile) that was proposed to it by the CB and asked the CB to undertake more analysis in the issue.[10] In New Zealand there is a written MOU between the CB governor, who is responsible for macroprudential policy, and the minister for finance, which says that the CB governor must consult with the minister when macroprudential policy actions seem likely. In Singapore, where "stamp duties" have been an important policy tool to address rapidly increasing house-price valuations, informal consultative arrangements are in place between the CB and MoF. For Finland, where the PR is the existing agency with macroprudential responsibility, the PR and CB jointly conduct systemic risk monitoring and jointly prepare vulnerabilities analyses and preliminary recommendations on macroprudential tools for the PR director.

c. Financial stability committee membership and leadership

Most of the FSCs (39 of 47) have three to five member agencies, with a range of 2 to 9. A PR is always represented, either independently or as part of the CB, which is not surprising since most macroprudential tools would apply to regulated financial firms (table 1). The CB is on the FSC in all but one country – specifically Chile – although it has observer status. The MoF is on fewer FSCs, although in four of the seven countries where it is not a member – specifically, Malta, Portugal, Slovenia, and the U.K. – it participates in meetings as an observer. Market regulators, insurance company regulators, pension fund regulators, and deposit insurers also are frequent FSC members. Additionally, a handful of countries have other agencies on the FSC – such as, the country's accounting standards authority (France), its consumer protection regulator (South Africa and the United States), or other government departments (India).

The literature on monetary policy committees – such as that by Blinder (2007, 2008) – emphasized the need to capture a range of expertise and the desirability for consensus on the committee as considerations influencing the number of members on a policy committee. For FSCs, however, the exact number of agencies represented seem to largely reflect the number financial regulatory authorities that are already in existence in a country rather than these considerations. That is, if, in a country, there are a large number of agencies each with authority over a relatively limited part of the financial sector – that is, a separate bank regulator, insurance company regulator, pension fund regulator, and market regulator and a separate authority administering the deposit insurance fund – FSCs typically have a large number of members. In contrast, if, in a country, there are only a small number of agencies with authority for multiple parts of the financial sector – that is, the bank regulator also has authority for other financial institutions, perhaps also financial markets, and perhaps also the deposit insurance fund – FSCs typically have a small number of

[10] See the National Bank of Belgium's 2017 FSR (page 12 and 39) for a discussion of this incident (link: https://www.nbb.be/doc/ts/publications/fsr/fsr_2017.pdf).

members. In both cases the range of expertise on the FSC would be about the same, and, although the ability to obtain consensus would be different, this seems to be a secondary consideration to financial sector coverage.

In addition, seven countries have independent members on the FSC; that is, committee members who are unaffiliated with any agency on the committee but have expertise on various financial sector topics. Independent members can bring additional expertise and an outside perspective. Their inclusion may also indicate that the FSC was created for the purpose of taking actions, rather than just coordinating among existing agencies.

Next, we look at the chair of the FSC to measure leadership, since the chair sets the agenda and often serves as the government's official voice on macroprudential policies. The MoF is the most frequent chair, either chair or co-chair of 25 FSCs. We interpret this role for the MoF as strengthening the political legitimacy of macroprudential policy relative to if the CB or PR had this role. Thus, the high frequency of MoF chairs would be at odds with a recommendation by the IMF to limit the participation of politicians due to the possibility of them delaying the implementation of time-varying policies. CBs are the next most frequent chairs, specifically the chair or co-chair of 18 FSCs, where in three cases they are co-chair with the MoF and in one they are co-chair with the PR. In no country is the PR the sole chair, but it is a co-chair with the CB in Switzerland. In seven other countries, there is no chair or the chair rotates, suggesting weaker leadership: In Romania and Brazil, the chair rotates between all members, in Ireland, Israel, Japan, and the Philippines, there is no FSC chair, while for Saudi Arabia we could not find any information about the FSC's chair.[11]

d. Financial stability committee powers

FSCs differ in terms of direct powers. Based on the Tinbergen separation principle (that Carrillo et al., 2017 document to be quantitatively material), we expect that a FSC with its own tools, could achieve better outcomes than if authority over tools were to remain at member agencies. While member agencies could implement macroprudential policies, they may also have other mandates which could be in conflict at times with financial stability. Moreover FSCs with their own powers increases transparency and accountability for financial stability from when tools are dispersed among member agencies.

Direct powers. Few FSCs have what the IMF/FSB/BIS report (2016) and the IMF's (2013) *Key Aspects of Macroprudential Policy* 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. 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.

[11] For the 14 euro area countries with FSCs, seven have designated the MoF as the chair, six have designated the CB as the chair, and one country's FSC has no chair. FSCs in France, Germany, Italy, and Spain have the MoF as chair. This suggests, again, that including the euro area countries does not bias our sample in a specific direction.

Only 13 of the 47 FSCs have semi-hard or hard powers to direct countercyclical actions (table 1). Three FSCs – France's High Council for Financial Stability (HCFS), Malaysia's Financial Stability Executive Committee (FSEC), and UK's Financial Policy Committee (FPC) – have hard powers over time-varying macroprudential tools.[12] In the case of France, the HCFS has authority over setting the CCyB, while in the case of the U.K., the FPC has authority over a range of time-varying macroprudential policy tools, including the CCyB and LTV ratios. For Malaysia, the FSEC decides on specific measures to be taken by the CB, which is the PR for banks and insurance companies, to avert or reduce risks to financial stability and can issue orders to any person or financial institution not supervised by the CB. Ten others have only semi-hard powers, which is the authority to make recommendations with formal comply or explain authority.[13] The remaining 34 FSCs in our sample have either only "soft" powers, which enable policymakers to express an opinion or issue a warning or non-binding a recommendation but without any comply or explain requirements, or to serve only an information-sharing or policy-coordination function across agencies, which is an even softer power. Thus, it appears that few FSCs function to implement policies.

Comply or explain powers for FSCs are well-suited to situations where further judgment by the member agency implementing the policy is important, and where a policy action is expected to face considerable political pressure, such that broad support and transparency for an agency's actions are needed (see IMF, 2013 for this view). 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.

That said, more recent experience suggests that FSC comply or explain instructions can also be directed at cyclical risks. For example, in June 2014 the U.K.'s FSC made recommendations to microprudential authorities in relation to cyclical developments in owner-occupied mortgage lending. Similarly, in January 2016, September 2016, and April 2018, Iceland's FSC recommended to the PR – the agency with ultimate authority for setting the CCyB – that the tool be activated to 1 percent and then increased to 1.25 percent and again 1.75 percent, which the PR then implemented. Likewise, in December 2017, Denmark's FSC recommended to the Minister for Industry, Business, and Financial Affairs that the tool be activated to 0.5 percent and about six months later recommended an increase to 1 percent. 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,

[12] The U.S. Financial Stability Oversight Council (FSOC) can designate nonbank financial firms as systemically important. Such designations need two-thirds majority support from the members of the FSOC and the Secretary of the Treasury must be part of this majority. Similarly, the UK FPC has the power to make recommendations to HM Treasury on the regulatory perimeter and on which activities should be regulated and whether an institution carrying out regulated activities should be designated for prudential regulation by the Prudential Regulatory Authority (PRA) rather than the Financial Conduct Authority (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.

[13] 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.

Denmark, Finland, Luxembourg, the Netherlands, Sweden and the United Kingdom).[14] 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.

Voting. We also collected information on voting, which we interpret as a process that would facilitate taking actions. We find that 24 of the 47 FSCs take votes, where we also consider FSCs that explicitly state that they aim to reach decisions by consensus as voting. All but two of these 24 FSCs that take votes are formal FSCs. All FSCs that have hard powers over time-varying macroprudential policy tools vote, while of all the FSCs that have semi-hard tools and all but one – specifically, Hong Kong's FSC – vote. Thus, voting appears to be related to powers.

Still, there are 12 FSCs that vote but do not have either hard or semi-hard tools. We find that in the majority (about seven) of these cases, the FSC can issue warnings about financial stability risks and make recommendations – albeit non-binding ones – to agencies. One of these FSCs in discussing their voting practices emphasize the desirability of achieving consensus and unanimity among FSC members in arriving at their decisions in preference to just achieving a majority, since without comply or explain powers achieving unanimity strengthens the effect of the FSC's recommendation. This means that five FSCs that do vote function only to undertake activities like monitoring, and sharing information or coordinating policies across agencies. These FSCs likely vote on issues like information sharing agreements between agencies, workplans for interagency groups, or public communications. From the other perspective about seven of the 23 FSCs that do not take votes can issue warnings about financial stability risks and make non-binding recommendations.

Communication. Communication is a soft tool that authorities could use to raise public awareness of risks and understanding of the need for authorities to take mitigating actions (see IMF, 2013 and 2014, and CGFS, 2016). A principal form is a financial stability report (FSR), but in our dataset, nearly all are published by the CBs and only a few FSCs publish FSRs, including those in the U.S. and Mexico. Cihak et al. (2012) document the rapid growth in the number of CBs that published FSRs, from 1 to 80, between 1996 and 2011, but also that there is a general lack of "forward-lookingness" in FSRs, which would make them less capable of assessing systemic risks. Correa, et al. (2017) document that while the sentiment conveyed by CBs in the FSRs correlates with the financial cycle, communications in the FSR have little influence on the financial cycle.

e. Macroprudential powers outside of financial stability committee powers

Since our review found that very few FSCs have hard tools, we looked further at whether individual agencies have authorities to implement time-varying tools. We focus on LTVs, which has been documented to be the most frequently-used tool in Cerutti et al. (2016) and Akinci and Olmstead-Rumsey (2017), and the new CCyB. While surveys suggest that the use of macroprudential tools has been growing and now is substantial, the actual frequency of change for most tools is very limited, suggesting

[14] 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)

most are not used in a time-varying way to address cyclical vulnerabilities. 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.[15] Akinci and Olmstead-Rumsey (2017) document that LTVs are the most frequently-used macroprudential tool, and were either tightened or loosened in 57 countries about 80 times in the fourteen years from 2000 to 2013.[16] Debt service-to-income ratios were also used, but less frequently, about 30 times, and most were in emerging market economies.

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, although it would apply only to regulated banks. Because of these features, a country could decide that the tool could be given to the PR that regulates banks, the CB with skills in system-wide risk analysis, or the FSC because it is strictly a macroprudential tool.

Overall, our tabulation suggests that while most countries have the authorities for CCyB and LTV adjustments, FSCs almost never directly controls these tools (table 2). For the CCyB, 53 countries have established the authority, but only three FSCs can set or direct the CCyB. The CB has the power in 32 countries, the PR in 17, and the MoF (including other government) in four, albeit most with a strong role for the CB in providing advice. This tabulation indicates that countries generally have assigned this new tool to existing regulators for capital.

In contrast, use of LTVs likely involves more political economy considerations than the CCyB, because they apply to borrowers rather than lenders, and tightening LTVs may be in more direct conflict with other social objectives, such as expanding homeownership. We tabulate that 39 countries have established the authority for LTVs, less than for CCyB, 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. Again, we find that FSCs do not direct the setting of this tool. The FSC has authority in two countries, while the CB has it in 22, the MoF (and other government) in nine, and the PR in seven.

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 that 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

[15] Cerutti et al. (2014) review the use of 12 macroprudential tools, but most were changed very infrequently over 2000 to 2013. Cerutti et al (2016) show that in addition to LTVs and reserve requirements, the three most frequently used tools – general capital, concentration limits, and interconnection limits – 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 the CB retains the authority for reserve requirements, even if a FSC exists, and as such do not include this tool in our analysis.

[16] See also Kuttner and Shim (2013), and specifically Figure 2. They document the use, albeit infrequent, of mortgage LTV ratios to address cyclical macrofinancial risks pre-crisis.

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.*[17]

As noted above, very few FSCs publish FSRs while nearly all CBs publish them. Since nearly all CBs publish an FSR, we look at when they started to publish relative to when the FSC was created. We assume that CBs that published FSRs before the FSC was created have some degree of responsibility, either explicit or implicit, in at least communicating about financial stability risks. In our dataset, 38 of 47 CBs began publishing FSRs at least a year before the FSC in the country was established, suggesting a high share of CBs had some pre-existing stake in financial stability.

In summary, FSCs rarely have direct authorities for these time-varying tools and members retain the authorities for setting the tools Such an arrangement of FSCs in which the traditional agencies participate as members could still – per the findings of Bodenstein et al. (2014) – produce benefits from improved communication or information sharing.[18] However, conflicts for policy use could arise if the agencies have only microprudential mandates and do not also have a financial stability mandate, and there is less clear accountability for financial stability.

4. Empirical analysis of FSC structures and characteristics

In this section, we investigate the motivations for countries to set up their financial stability governance structures; that is, whether FSCs are primarily formed to take or direct actions, or to improve information sharing, communication, and coordination of policies across agencies. We take two approaches to consider this question. First, we use logit regressions to evaluate which countries have set up a FSC as opposed to not having set up a FSC and consider whether characteristics of these countries seem more consistent with FSCs, in general, being set up to coordinate versus to take action. We also look at FSC processes and authorities that would put a FSC in a stronger position to take action rather than just coordinate using cluster analysis. Consistent with the implications of our logit regressions, we find that a relatively small portion – about one-quarter – of FSCs appear positioned to be able to take actions in the face of building financial stability risks given their existing authorities.

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[17] Source: https://www.nbb.be/doc/ts/publications/buffer_rate_policy_strategy.pdf

[18] For example, in countries where the PR has the authority for the CCyB 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 government not on the FSC. However, in this case there is a clearly-articulated process for consultations with the CB and PR.

Lastly, we consider whether FSCs being set up largely to coordinate reflects the fact that other agencies are in a strong position to take action. We focus on the CB, given that it has specialized skills stemming from its monetary policy function to undertake time-varying macroprudential policy in a preemptive way. We find generally that FSCs that are less able to take actions are not this way because the CB is especially strong in this regard, suggesting that many countries do not have either a strong FSC or a strong CB for macroprudential actions.[19]

a. Motivation for setting-up a financial stability committee – logit regression analysis

In the logit regressions for a country's decision to set up a FSC or not, the dependent variable in our main set of regressions is called "FSC exists" (*FSC exists*) and is assigned a value for each country according to the following definition:

- *FSC exists* = 0, if no FSC exists; and,
- *FSC exists* = 1, if a formal or de facto FSC exists

This variable is defined for all 58 countries in our dataset. In our dataset, *FSC exists* = 0 for 11 countries and *FSC exists* = 1 for 47 countries.

If better communication and coordination is a motive, we would expect that countries with more financial regulators and that are larger would benefit most from the formation of a FSC. To approximate the number of regulators that countries would want to be involved in setting macroprudential policies, we use variables designating whether the central bank is a PR for banks (*CB is a PR*) and whether the central bank is also a regulator for other part of the financial sector (*CB is a wide PR*). If coordination is a motive, a CB that is also a PR would require fewer agencies to coordinate, so we would expect a negative coefficient on these variables. Country size may reflect more agencies or interests to consider, and so we would expect a positive coefficient. To approximate country size we use the variable *log (GDP)*. Our logit regression specification is given by:

$$Prob(FSC\ exists) = \frac{e^{a+bX}}{1+e^{a+bX}}$$

where *X* includes *CB is a PR*, *CB is a wide PR*, and *Log GDP* in the baseline specification. The sample characteristics of the regressors in our baseline characterization are given in table 3, panels A and D. The CB is a PR in 60 percent of the countries, and is a wide regulator for more than banks in 31 percent. Note

[19] The motivation for our analysis is similar to that of Lombardi and Siklos (2016), Smaga (2013), Healey (2001), and Osterloo and de Haan (2003) although our approach is quite different. Lombardi and Siklos, Smaga, and Healey construct indices that are weighted sums of a wide range of different measures. Additionally, while they aim to measure a country's ability to implement macroprudential policy, they use a very wide range of variables that are not tied tightly to macroprudential policy, such as whether the country has deposit insurance, in the case of Lombardi and Siklos, or has payments system and liquidity support operations, in the case of Smaga and Healy. Osterloo and de Haan use a more narrow set of measures related to the CB and financial stability but undertake a purely narrative exercise, and thus consider the measures one at a time, rather than as a whole as in our cluster analysis.

also that the CB's role in the microprudential regulatory structure were largely in place when countries set up their financial stability governance structures.[20]

Table 4, column 1 shows coefficient estimates for these variables, which are highly supportive of a coordination role for FSCs. A country for which the CB is the PR as well as the PR for more than banks has a 60 percent probability of having a FSC (assuming *Log GDP* at the sample average), which is low given the unconditional probability is 81 percent (that is, 47 divided by 58 countries). A country for which the CB is only the bank PR (which would imply more separate financial regulators) has a 90 percent probability of establishing a FSC, while a country for which the CB has no microprudential authorities has a 93 percent probability. Larger countries also have higher probabilities of having a FSC.

We include additional variables to show robustness of these results in Columns 2 through 11. All variables are described in table 3. We add these variables one-by-one since many variables are fairly highly correlated and we have only 58 countries in our dataset. A first set of variables reflect the depth of a country's financial system, where greater financial depth might proxy for a more complex financial system that then has more regulators and thus a greater need for coordination. We use two variables to consider financial depth; an index of financial development (Svirydzenka, 2016) and the nonfinancial credit-to-GDP ratio. Both variables have positive coefficients, though only the credit-to-GDP ratio is significant at the 10 percent level, and is not economically significant. That is, a one standard deviation higher credit-to-GDP ratio relative to its average only boosts the probability of a country having a FSC by 1 or 2 percentage points. Additionally, adding the IMF's index of financial development and the credit-to-GDP ratio does not change our coefficient estimates for *CB is a PR*, *CB is a wide PR*, and *Log GDP*.

We also include some variables to consider whether the riskiness of an economy might affect the formation of a FSC because these countries might want stronger governance for more effective policies. Specifically, we include the standard deviation of GDP relative to average GDP – that is, the coefficient of variation of GDP – over previous decades, and the number of financial crises that the country has suffered since 1970. Per Bruno and Shin (2014), we also add a variable reflecting the variability of capital inflows – specifically, the coefficient of variation of log capital inflow to GDP – and include a measure of a country's wealth, as measured by per-capita GDP. None of these four variables are significant and none change the coefficients that we obtain on *CB is a PR*, *CB is a wide PR*, or *Log GDP*.

To reflect the soundness of a country's overall governance, we include Rule of law and Checks and balances to represent countries with structures in place to protect rights and processes for policy-making.

[20] Although 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, after moving the PR into the CB, to have no FSC and the CB as the macroprudential authority. 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 macroprudential 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, it moved the PR for financial institutions into the CB, created a separate markets regulator, and made the CB the 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, the U.K. Financial Services Authority was dissolved with its prudential responsibilities moved into the newly created PRA and its conduct responsibilities moved into the FCA.

While these characteristics could be consistent with creating FSCs for coordination – because coordination may be more effective in this environment – they could also be consistent with instead allowing an existing agency – primarily the CB – to have authority for macroprudential policy, because there are fewer concerns about abuses of concentrated power when these practices are in place. Finally, we also include characteristics about the independence of the CB. Greater CB independence might make countries want a FSC, to coordinate rather than let a CB act on its own, since doing so would reduce the risk of an excess concentration of power. None of these governance variables are significant either and none change the coefficients that we obtain on *CB is the PR*, *CB is a wide PR*, or *Log GDP*.[21]

We provide additional insight into a country's decision to set up a FSC and look only at those countries where the CB is the PR and consider why some of these countries form a FSC while others do not set up an FSC and designate the CB as the macroprudential authority. (Note that the CB is the designated agency in nine of the 11 countries without FSCs). The dependent variable in this regression, called "CB in PR and FS" (*CB in PR and FS*), is assigned a value for each country in which CB is the PR according to the definition:

- *CB in PR and FS* = 0, the CB is a PR and *is not* a macroprudential authority because a FSC has been set up; and,
- *CB in PR and FS* = 1, the CB is a PR and *is* the economy's macroprudential authority (and a FSC has not been set up).

This variable is defined for only the 35 countries in our dataset for which the CB is the PR. In our dataset *CB in PR and FS* equals 0 for 25 countries and equals 1 for 9 countries. Our logit regression is:

$$Prob(CB\ in\ PR\ and\ FS) = \frac{e^{a+bX}}{1+e^{a+bX}}$$

where *X* includes *CB is a wide PR and Log GDP* in the baseline specification. Relative to the equation for *FSC exists*, the variable *CB as a PR* has been dropped because all CBs are PRs in this regression. This CB logit regression is essentially the opposite of the *FSC exists* logit regression but conditioned on only countries where CBs are PRs, and so we expect the coefficient on *CB is a wide PR* to be positive and the coefficient on *Log GDP* to be negative if coordination is a motive for FSCs.

As shown in table 5, column 1, the coefficients for *CB is a wide PR* and *Log GDP* in this regression are essentially just the opposite of those in the *FSC exists* regression and, as such, provide additional support for the view that countries form FSCs primarily for coordination purposes. We also add a number of additional variables to reflect financial depth, the riskiness of the economy, and overall governance to our baseline specification. In all cases, these variables are insignificant in our CB logit regressions, as they were mostly for the FSC logit regressions. The coefficients on these variables in the CB regressions, while statistically insignificant, are in most cases similar in size but of the opposite sign of the coefficient on the same variable in the FSC regressions.

[21] The World Bank database from which we obtain the Rule of law variable has other variables that might reflect the functioning of the financial sector. We also considered Government effectiveness and Regulatory quality, but 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.

b. Motivation for setting-up a financial stability committee – cluster analysis

We also look at whether FSCs are set up to coordinate rather than to take action by defining FSC processes and authorities that would put a FSC in a strong position to take actions when financial stability risks are rising, and then consider the countries' characteristics. We focus on four processes and authorities that would put a FSC in a strong position to take action in the face of building financial stability risks: whether the FSC has been created formally created by legislation, whether the FSC has a chair, whether the FSC votes, and whether the FSC has tools. We use these variables in combination to summarize the FSC's ability to act since each on its own may be a narrow measure of strength. These variables are defined in table 3.

Whether the FSC has been created formally by legislation, as opposed to through more informal means, such as MOUs between agencies (*FSC is formal*), influences a FSC's ability to act because any action of a formal FSC will have greater legitimacy than that of n FSC that operates via inter-agency MOUs. Whether a FSC has a chair (*FSC has a chair*) also influences a FSC's ability to act, since a FSC without a chair is less likely to be able to move forward initiatives to address building risks. Additionally, by having a FSC chair, there may be more accountability for both the FSC's actions and inactions, which should create a greater incentive for it to respond to building risks. Whether the FSC takes votes, where this includes FSCs that reach their decisions by consensus (*FSC votes*) should also influence a FSC's ability to act, because voting means that the FSC does take a decision, which, all else equal, makes taking action more likely. Lastly, whether the FSC has hard or semi-hard tools *(FSC has good tools)* is also important, since employing tools is ultimately the way that a FSC would respond to building risks.

We use cluster analysis to consider FSCs' ability to take action in response to building financial stability risks because we have multiple variables that can signify ability to take action, and we do not want to impose priors that any variable would be sufficient on its own. While we believe that having "more" of the characteristics is stronger than having "none," we chose not to make an index because it would require weights on each variable and would obscure any correlations between variables.

Cluster analysis has been used elsewhere to study characteristics of governance structures of corporations (see Kaplan and Stromberg, 2002, and Gillan, Hartzell, and Starks, 2007).[22] In our case, we use cluster analysis to divide the FSCs into groups – or clusters – where the FSCs in each cluster are similar in terms of the four FSC characteristics defined above. We use a hierarchical iterative process that starts with each FSC as its own cluster and then progressively merges up individual clusters until some desired criteria is met. We adopt standard criteria for defining clusters, which is to minimize the dissimilarities of FSCs within each cluster – measured by squared Euclidian distances or weighted sum of squares – and to maximize the dissimilarities across clusters. A second criteria for choosing clusters is broad similarity in the weighted sum of squares in each of the clusters.

[22] Kaplan and Stromberg (2002) use cluster analysis to study the characteristics of venture capital contracts and Gillan, Hartzell, and Starks (2007) use cluster analysis to study the characteristics of corporate board structures and charter provisions.

Cluster analysis yields tree-like diagrams, called dendrograms, and the dendrogram for our analysis on FSCs is shown in figure 3. The hierarchical iterative process for forming clusters can be seen from the splits in the branches in the tree. The number of clusters in each figure is our choosing and determines when our algorithm stops merging clusters. Our criteria suggest four clusters each with about 12 countries. Our within (cluster) sum of squares' (WSS) values, which we report in the accompanying table, suggest that our clusters are quite compact. Indeed, for one cluster – the blue cluster – the WSS is zero, indicating that the countries in the cluster are identical across the variables used to construct the dendrogram. This is also evident from the dendrogram diagram itself, which shows no further branches for that cluster in the dendrogram.

We use a pseudo F statistic to select number of clusters. The pseudo F statistic for the cluster analysis describes the ratio of between-cluster variance to within-cluster variance (Calinski and Harabasz, 1974):

$$Pseudo\ F = (BSS / k\text{-}1) / (WSS / N - k)$$

where k is the number of clusters and N is the number of observations. Larger values of pseudo F indicate clusters that are more close-knit and more separated from others.

The pseudo F-statistics for the FSC dendrogram overall with four clusters is 48.6, indicating significance of clusters based on these four characteristics.[23] Panel A of the accompanying table reports for each cluster the averages of the characteristics that we used to form the clusters, and reports that they are jointly statistically significantly different across the clusters based on the Kruskal-Wallis test.

The clusters in the dendrogram in figure 3 are ordered starting from most able on the left to less able on the right. We view the FSCs in the blue cluster in figure 3 as being the most able of the FSCs to take actions. The 12 FSCs in this cluster all are formal, have a single chair, have a voting process, and have tools. The FSCs in the next group of 12 – the teal cluster – are mostly all formal, mostly have a single chair, and all have a voting process, but none of them have good tools, and so are not as able to take actions as FSCs in the blue cluster. We consider the next two groups – the red and olive clusters – as even less able to act. In particular, the FSCs in the olive cluster are mostly defacto FSCs, none vote, and none have tools.

Overall, our cluster analysis finds that only 12 out of 47 of the FSCs – that is, only about one-quarter – appear to be in a position to directly take actions in the face of building risks. The vast majority of the FSCs – that is, about three-quarters – have little ability to take action.

The remaining panels of the accompanying table consider other FSC and country variables that are not used in determining FSC ability to act but could vary across our clusters and provide insight into why countries choose to create strong or weak FSCs. Panel B reports other FSC characteristics, panel C reports other prudential governance variables, panel D reports broader country governance variables, and

[23] We chose four clusters rather than three or five based on the pseudo-F statistic. In addition, we tried a number of additional characteristics, which can lead to slightly different clusters. However, a robust result of the variations is that the most able FSC cluster has 12 countries, not a large number and the additional clusters represent differences among the less able FSCs.

panel E report economic characteristics of the country. In terms of other FSC variables, the strongest FSCs appear to be more likely to have independent members than the other clusters, consistent with stronger governance.

A few country variables appear to be significant across clusters. Countries with higher per capita GDP and higher financial market development are associated with stronger FSCs, as are countries with stronger Rule of law and Checks and balances. These indicators suggest countries that are wealthier, with strong governing mechanisms, and that have more developed financial systems are more likely to set up FSCs with ability to take actions reflecting both have the resources and infrastructure to do so as well as a need for good policies given the significance of the financial sector. Notably, however, while these variables seem to weaken initially as we move from stronger to weaker FSC clusters, some of them increase for the weakest group, such that the most able and least able FSC clusters share common country characteristics. Thus, we explore the relationship of FSC strength and the ability of existing agencies to take macroprudential actions, as countries with similar characteristics may both want a strong macroprudential policy framework but choose different arrangements to achieve that objective.

c. Central bank ability to act – cluster analysis

In terms of existing agencies with the ability to take actions, we focus on the CB given it has political independence and specialized skills relating to its monetary policy responsibilities to consider the economy and financial system as a whole, which is relevant for macroprudential policy. Using cluster analysis in a similar way, we evaluate whether CBs can be divided into groups based on their ability to take actions. We are especially interested in whether the strength of a CB is inversely related to the strength of a FSC – that is, FSCs are weaker in countries where the CB already can be a strong macropru authority, and vice versa that FSCs are strong when the CB is not a strong macropru authority. This latter case could reflect that countries that want strong, independent central banks for setting monetary policy do not also want to give the CB authority for macroprudential powers.

We focus on five characteristics that would put a CB in a strong position to take action in the face of building financial stability risks. First, a CB that is a PR (*CB is a PR)* will likely have better information and tools related to their regulated entities that can help to reduce financial stability risks. For example, CBs that also are PRs will have authorities for setting structural capital requirements. Second, a CB that is a wide PR (*CB is a wide PR)* may be even stronger since it has responsibility, at least for microprudential powers, for a broader swath of the financial system. The next two variables measure whether the CB has the authority for setting the CCyB (*CB has CCyB)* or for setting the LTV (*CB has LTV).* As discussed above, the CB has the authority in 32 of 47 countries with FSCs to set the CCyB, and in 22 to set LTVs. These are direct measures of ability to take actions. A fifth variable is based on whether the CB publishes a Financial Stability Report and whether it started publishing the report before the FSC was created (*CB early FSR).* We interpret a CB having published a FSR before the FSC was created as reflecting some responsibility, either explicit or implicit, for at least communicating about financial stability. In our dataset, 80 percent of CBs began publishing before the FSC was created. We use the above-mentioned five variables in combination to summarize the CB's ability to act since each on its own may be a narrow measure of strength.

The definitions of the five characteristics and the dendrograms for the CBs are shown in figure 4. As with the FSCs, the hierarchical iterative process for forming clusters can be seen from the splits in the branches in the tree. Our criteria suggest that three clusters is a good representation. Our within (cluster) sum of squares' (WSS) values, which we report in the accompanying table, suggest that one of the groups (the least able, the black cluster in the dendrogram) is very compact with a WSS of 0.9, indicating that the 18 countries in the cluster are nearly identical across the five variables used to construct the dendrogram.

The pseudo F-statistic for the dendrogram overall is 30.5, indicating significance. Panel A of the accompanying table reports for each cluster the averages of the characteristics that we used to form the clusters, and reports that the averages for each of the five variables are jointly statistically significantly different across the clusters based on the Kruskal-Wallis test.

The clusters in the dendrogram are shown with the least able – the black cluster – on the left. A striking feature of the least able to act CB cluster is the commonality of the 18 CBs. None of the 18 FSCs in this cluster are PRs or wide PRs, and none have the authority to set CCyB or LTVs. At the same time, nearly all of the CBs in this cluster published an FSR before the FSC was created, suggesting CBs that already had a role in promoting financial stability and are not a PR do not get new authorities for CCyB or LTVs.

Looking at additional macroprudential governance characteristics for this least able cluster, the chair of the FSC is more likely to be the MoF, and setting CCyB and LTVs are done by the PR and the MoF (or government more generally). Moreover, these countries have stronger Rule of law. Combined, this cluster represents countries that have set up governance structures for monetary policy and macroprudential policy that are highly separate.

The next two clusters – the blue and teal clusters – include all the CBs that are also a PR or a wide PR, and many have CCyB and LTV authorities, and thus are more able macroprudential authorities than the first cluster. The teal cluster represents CBs with more limited microprudential authorities as not all are PRs and none are a wide PR, but they are more likely to be able to set LTVs. In contrast, the blue cluster includes CBs that are stronger microprudential authorities but are unlikely to set LTVs. (There is little difference between the two groups in whether the CB has CCyB, likely because it is tied to whether the CB is a bank regulator.) These results suggest a tradeoff for the CB of either a strong microprudential regulator or strong macroprudential powers. Consistent with a tradeoff interpretation, CBs that are early FSR publishers – those as having an existing stake in financial stability – are less likely to set LTVs.

Other characteristics (shown in panels B to E) support not placing macroprudential powers at CBs that already have broad powers. The blue cluster with broader microprudential authorities also has more political independence for monetary policy – but not LTVs – consistent with not granting more authorities to an already powerful CB. The teal cluster that arguably represents the more able macroprudential CBs with LTVs, are in countries where the MoF is more likely to be the chair than the CB, consistent with countries putting in checks against a CB with both LTVs and CCyB. These results overall point to a pattern where countries do not grant additional macroprudential tools to CBs that already have other related authorities, suggesting political economy considerations are important factors in granting CBs macroprudential authorities.

d. Cross-tabulation of financial stability committees and central banks

We examine a cross-tabulation of FSC clusters and CB clusters. When countries have a weak FSC, there would be less concern for effective policymaking if the CB were strong than if it were also weak. However, we do not find an inverse relationship. Instead, weak FSCs appear randomly distributed across the CBs by ability to act. For the 23 weak FSCs, 10 are paired with CBs that lack any macroprudential authorities, six with CBs that are broad microprudential regulators and could be moderately strong, and seven with more able macroprudential CBs. Thus, we do not find compelling evidence that suggests that FSCs are weak because the CBs are strong.[24] Conversely, of the 12 countries with strong FSCs, 5 countries have weak CBs for macroprudential authorities, again not compelling evidence of an inverse relationship.

To summarize effectiveness, we tally up effective authorities based on the criteria specified above – whether they have tools, accountability, and can reduce policy inertia. There are 12 effective FSCs and 11 CBs. One country has both an effective FSC and CB, so there are a total of 21 distinct countries. There are an additional five countries that are in the moderately able FSC cluster and moderately able CB cluster, which combined could be effective, which could raise the total to 26 countries. This tally suggests that 21of 47 countries with FSCs have neither a strong FSC nor a strong CB, suggesting many countries lack effective institutional structures for dynamic macroprudential policies. Of course, we have looked only at institutional structures at this point to evaluate effectiveness, but as more experience with macroprudential actions develops over time, we will be able to relate country experiences to their institutional structures and draw more definitive conclusions.

e. Comparison to classifications of macroprudential authorities in the IMF survey

Given most FSCs are new entities, there is some lack of clarity about their responsibilities and authorities. To provide further information on our categorization of strong and weak FSC clusters, we match our dataset to information on governance in the IMF's Annual Macroprudential Survey which was launched in 2017 (see IMF, 2018). The IMF acknowledges that some responses they received may not accurately capture macroprudential policymaking and expect that the quality will improve over time, but we nonetheless believe it is useful to compare our sample to the IMF survey results.[25]

The matching of datasets shows 44 of our 47 countries with FSCs are in both (three countries did not respond to the survey). An interesting survey result is that 22 (or one-half) of these 44 countries do not report that their FSC is a macroprudential authority. It is reassuring for our analysis that our clustering to determine the countries with weak FSCs – the olive and red "less able" clusters in figure 3 – overlap

[24] We also evaluated clusters based on the full dataset of 58 countries rather than the 47 countries with FSCs. With 58 countries, four clusters were more significant than three clusters, but general results are not materially changed. There remains a large cluster of least able CBs, and there is a mix of attributes in the three clusters of the CBs that are also PRs in terms of their macroprudential authorities. Also countries appear more likely to grant setting LTVs or chair of FSCs to CBs that are not also wide PRs, suggesting they do not choose to place more powers in a CB that has more microprudential authorities. Moreover, we do not find that weak FSCs are offset substantially by strong CBs.

[25] One example provided by the IMF (2018) is that some countries report measures that are generally thought of as being microprudential – such as minimum capital requirements – when asked to report macroprudential policies.

considerably with the countries that in the IMF survey report that their FSC is not the macroprudential authority. That is, there are 15 "less able" FSCs among the total of 22 FSCs that are reported in the survey as not being a macroprudential authority.

In terms of whether the IMF survey results can shed further light on whether countries have an effective governance structure, we further focus on the 22 countries where the survey reports that the FSCs are not a macroprudential authority but the CB is an authority and on whether, based on our cluster analysis, the CB is able to take actions.[26] For these 22 countries, 16 report in the survey that the CB is an authority (three report the PR and three report "other" as authorities). Of these 16 CBs that are reported as a macroprudential authority, our analysis places half in the "more able" cluster. These results are in line with our general conclusion that FSCs that are "less able" are not set up that way because there is already a CB with macro analysis expertise to take time-varying macroprudential actions that overcome policy inertia problems.

5. Conclusion

Most countries now have FSCs, but most are not designed to take or direct macroprudential actions to promote financial stability. Only one-quarter have attributes – formal, voting process, single chair, and good tools – that would make them a "more able" macroprudential authorities, and one-half lack two or more of these attributes. Other FSCs that lack tools and clear accountability still may produce benefits by facilitating better communication and coordination across agencies. FSCs generally also broaden the political legitimacy of macroprudential policy by involving the ministry of finance, often as the chair of the FSC, though that may introduce a greater tendency to delay taking actions in response to building risks.

Some countries with FSCs have granted macroprudential authorities to the CB, but we do not find that countries with less effective FSCs are more likely to have CBs with more macroprudential authorities. We find that CBs that are broad PRs and have higher political independence for monetary policy are not likely to also set LTVs. Rather LTVs are granted to CBs that are not broad microprudential regulators nor have high political independence for monetary policy, and for which the MoF is more likely the chair of the FSC rather than the CB as chair. We infer that countries generally do not want CBs to simultaneously have strong powers for microprudential policy, monetary policy, and macroprudential policy. We tabulate overall that up to 26 countries with FSCs can take or direct some macroprudential actions without a high risk of policy inertia based on both FSC and CB institutional arrangements. This suggests that in many countries, FSCs or FSCs and CBs combined may not set macroprudential policy in a way that it provides an alternative to monetary policy to address cyclical systemic risks. Of course, we have looked only at institutional structures at this point to evaluate effectiveness, but as more experience with macroprudential actions develops over time, we will be able to relate country experiences to their institutional structures and draw more definitive conclusions.

[26] Interestingly, the survey results show that only 26 CBs (60 percent of 44 CBs) are a macroprudential authority (single or shared authority) and 18 are not, suggesting countries are not heavily reliant on their CBs for macroprudential policy.

This study provides a snapshot of institutional structures and practices of macroprudential authorities, which continue to evolve. Even as countries continue to develop their frameworks, this study is useful for countries as a benchmark of current practices and what those practices reveal about competing objectives for macroprudential policy, including effectiveness but also concerns about interactions with existing microprudential regulators, excess concentration of power in a CB, and possible conflicts with other social objectives. We believe that the highly varied legal, regulatory, and financial structures across countries makes it unlikely that a single institutional arrangement would be optimal for all countries. But we believe it is important to highlight that the evidence suggests that countries are placing relatively low weight on the ability of policy institutions to take action and relatively high weight on political economy considerations.

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Figure 1. **Number of Financial Stability Committees, by year of formation**

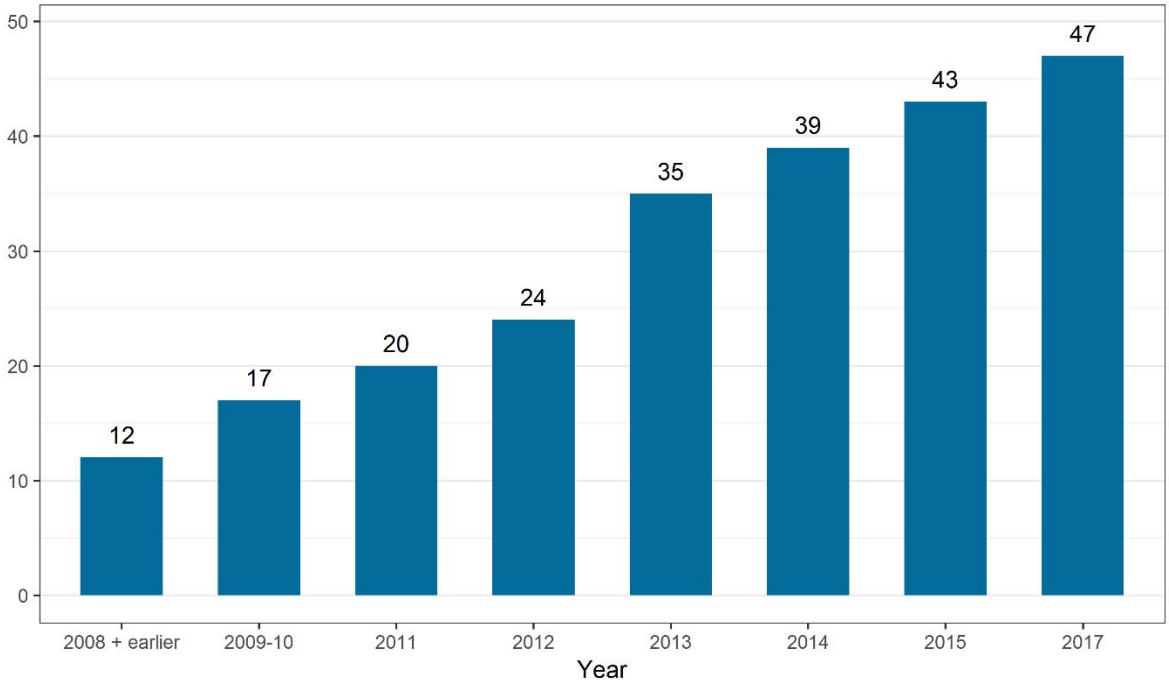


Figure 2. **Financial stability authorities**

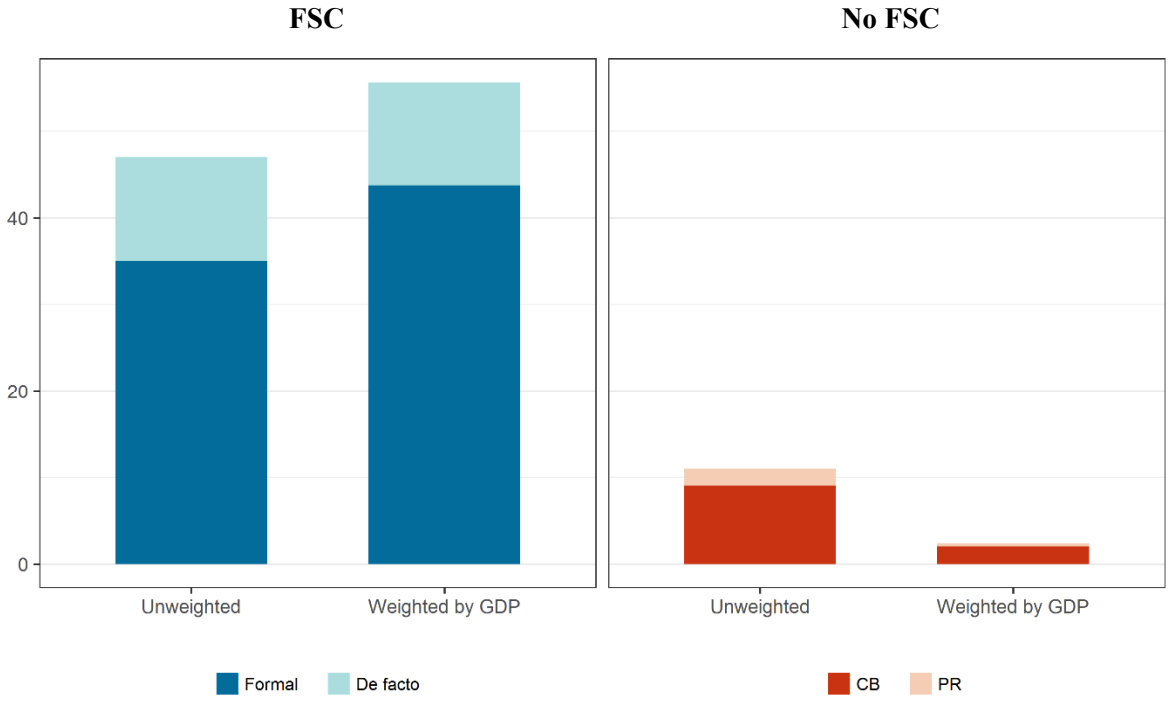


Table 1. **Financial Stability Committees: Membership, leadership, and authorities**

	No. of countries
Macroprudential Authorities	
FSC	47
Formal	35
De facto	12
No FSC	11
CB is the macroprudential authority	9
PR is the macroprudential authority	2
FSCs	
Membership	
MoF	40
CB	46
PR	47
Independent	7
Chair or co-chair	
MoF	25
CB	18
PR	1
Other	7
Voting process	
Yes	24
No	23
Tools	
Soft at most	34
Semi-hard at most	10
Hard	3

***Table 2*. Authorities for selected tools**

	CCyB	LTVs
Country designates an authority:		
Yes	53	39
No	5	19
If Yes, which agency:		
FSC	3	2
Central Bank	32	22
CB as PR	30	19
Ministry of Finance**	3	7
Prudential Regulator	16	7
Other*	1	2

* Includes "Government" (Argentina)
** Includes where the MoF sets the CCyB with input from the CB or PR

***Table 3*. Regression and cluster analysis variables**

		Mean	Std. dev.	10th pctl.	90th pctl.
A. Central bank micro- and macroprudential gov. variables					
CB is a PR	As collected in our dataset and equal to 1 if the CB is the PR and 0 if not.	.60	.49	0	1
CB is a wide PR	As collected in our dataset and equal to 1 if the CB is the PR of more than just banks and 0 if not.	.31	.47	0	1
B. Other central bank governance variables					
CB political independence	As measured by Grilli, Masciandaro, and Tabellini (1991) and based on the involvement of the government in appointing the CB governor or as a participant for formulating monetary policy.	0.64	0.30	0.25	1
CB operational independence	As measured by Grilli, Masciandaro, and Tabellini (1991) and 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.	0.78	0.18	0.56	1
C. Broader country governance variables					
Rule of law	As measured by the World Bank to capture the traditions and institutions by which authority in a country is exercised and is a measure of 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.	0.78	0.91	-0.51	1.84
Checks and balances	As measured originally by the World Bank and now the Inter-American Development Bank to capture the institutions by which limits are placed on the actions of one branch of the government by other branches of the government with purview over these actions.	0.66	0.24	0.20	0.85

***Table 3*. Regression and cluster analysis variables, continued**

		Mean	Std. dev.	10th pctl.	90th pctl.
D. Economy-characteristic variables.					
Log GDP	An indicator of the economy's size. As reported by the World Bank and measured by US dollar denominated GDP.	26.4	1.5	24.4	28.5
GDP per capita	An indicator of a country's wealth. As reported by the World Bank and measured by GDP in US dollars per person.	29.5	16.9	6.7	52.3
Coef. of variation of GDP	An indicator of the variability of a country's GDP and measured by the ratio of the standard deviation to the average of GDP from 1980 to 2007.	.17	.05	.12	.24
Private credit-to-GDP	As reported in the BIS statistics. An indicator of an economy's credit intensity and is measured by the ratio of private nonfinancial credit to GDP.	3.01	1.14	1.94	4.32
Coef. of variation of log capital inflows-to-GDP	As reported by the IMF WP 13/183 Capital Flows database. An indicator of the variability of logged gross capital inflows to GDP and measured by the standard deviation of logged gross capital inflows to GDP divided by its average. (We drop Luxembourg, an extreme outlier.)	91.85	53.76	32.70	168.56
Number of crises	As measured by Laeven and Valencia (2012) and is the number of financial crisis experienced by a country since 1970 – defined as a severe impairment of banking intermediation that required some fiscal assistance.	1.14	.76	0	2
Financial development index	As measured by Svirydzenka (2016) in IMF WP 16/5 and based on the depth, access, and efficiency of countries financial institutions and markets.	0.60	0.21	0.33	0.85
Financial market development index	As measured by Svirydzenka (2016) in IMF WP 16/5. See above.	0.65	0.20	0.35	0.90
Fin. institution development index	As measured by Svirydzenka (2016) in IMF WP 16/5. See above.	0.55	0.26	0.19	0.86

Table 4. **Regression for the probability of a country having established a FSC**

	Dependent variable: FSC exists = 1 / FSC exists = 0										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
CB is PR indicator	-0.43	-0.31	-0.29	-0.36	-0.18	-0.54	-0.39	-0.54	-0.50	-0.27	-1.03
	(1.08)	(1.08)	(1.09)	(1.10)	(1.13)	(1.10)	(1.09)	(1.12)	(1.09)	(1.10)	(1.25)
CB is wide PR indicator	-1.78*	-1.79*	-1.73*	-1.96**	-1.94*	-1.75*	-2.10**	-1.74*	-1.72*	-1.94**	-1.77*
	(0.94)	(0.95)	(0.96)	(0.99)	(1.01)	(0.94)	(0.99)	(0.94)	(0.95)	(0.97)	(0.96)
Log GDP (2007)	0.46*	0.31	0.42	0.54*	0.49*	0.50*	0.67**	0.46*	0.46*	0.46*	0.49*
	(0.27)	(0.31)	(0.31)	(0.29)	(0.28)	(0.28)	(0.33)	(0.27)	(0.27)	(0.27)	(0.27)
Financial development index		2.44									
		(2.18)									
Private credit-to-GDP			0.02*								
			(0.01)								
Number of crises				-0.42							
				(0.49)							
Cov(GDP) (2007)					16.14						
					(10.66)						
Per-capita GDP (2007)						-0.01					
						(0.02)					
Log capital inflows-to-GDP (2007)							0.32				
							(0.40)				
Rule of law								-0.19			
								(0.45)			
Checks and balances									-0.29		
									(1.57)		
CB political independence										-1.35	
										(1.38)	
CB operational independence											-2.65
											(2.63)
Constant	-9.52	-7.10	-9.98	-11.11	-13.07*	-10.03	-15.92*	-9.44	-9.29	-8.76	-7.92
	(6.86)	(7.51)	(8.00)	(7.32)	(7.56)	(6.94)	(8.98)	(6.79)	(6.83)	(7.01)	(6.90)
Observations	58	58	58	58	58	58	57	58	57	58	58
Log Likelihood	-23.30	-22.65	-21.53	-22.94	-21.87	-23.12	-21.86	-23.21	-23.15	-22.80	-22.74
Akaike Inf. Crit.	54.60	55.29	53.06	55.87	53.74	56.24	53.71	56.42	56.31	55.61	55.48

Note: *p **p ***p<0.01

Table 5. **Regression for the probability of a CB that is a PR being the macroprudential authority**

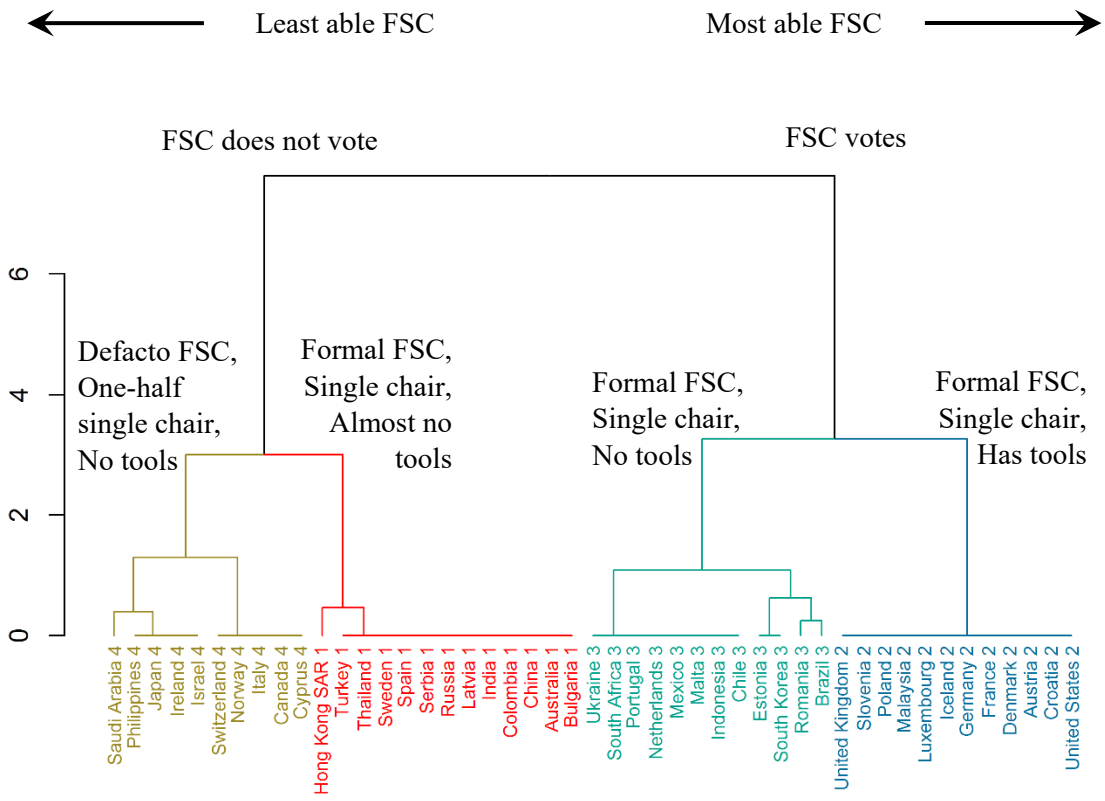
	Dependent variable: CB in PR and FS = 1 / CB in PR and FS = 0										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
CB is wide PR indicator	1.88*	1.84*	1.77*	2.23**	1.94*	1.89*	2.30**	1.83*	1.87*	2.06**	1.94*
	(0.98)	(0.97)	(0.97)	(1.09)	(1.02)	(0.98)	(1.07)	(0.99)	(1.00)	(1.02)	(1.02)
Log GDP (2007)	-0.59	-0.45	-0.51	-0.76*	-0.58	-0.58	-0.81*	-0.68*	-0.61*	-0.62*	-0.68*
	(0.36)	(0.43)	(0.40)	(0.42)	(0.36)	(0.37)	(0.43)	(0.38)	(0.36)	(0.37)	(0.37)
Financial development index		-1.77									
		(2.71)									
Private credit-to-GDP			-0.01								
			(0.01)								
Number of crises				0.63							
				(0.55)							
Cov(GDP) (2007)					-11.79						
					(10.81)						
Per-capita GDP (2007)						-0.004					
						(0.03)					
Log capital inflows-to-GDP (2007)							0.05				
							(0.48)				
Rule of law								0.64			
								(0.60)			
Checks and balances									0.76		
									(1.80)		
CB political independence										1.40	
										(1.60)	
CB operational independence											3.10
											(2.98)
Constant	13.38	10.54	12.17	16.87	14.86	13.14	18.58*	15.24	13.22	12.91	13.35
	(9.25)	(10.30)	(10.14)	(10.27)	(9.35)	(9.38)	(11.14)	(9.57)	(9.08)	(9.50)	(9.14)
Observations	34	34	34	34	34	34	33	34	33	34	34
Log Likelihood	-16.38	-16.16	-15.74	-15.74	-15.68	-16.37	-15.02	-15.75	-16.17	-15.98	-15.78
Akaike Inf. Crit.	38.76	40.33	39.47	39.48	39.37	40.73	38.04	39.49	40.34	39.96	39.55
Note:											*p**p***p<0.01

Figure 3. **FSC ability to act dendrogram and characteristics of clusters**

Dendrogram based on:

- *FSC is formal*, which
  - equals 1 if the FSC has been created formally by legislation
  - equals 0 if the FSC exists only through non-legal arrangements between agencies
- *FSC has a chair votes*, which
  - equals 1 if the FSC has a chair or co-chair
  - equals 0 if the FSC does not have a chair or co-chair
- *FSC votes*, which
  - equals 1 if the FSC takes votes
  - equals 0 if the FSC does not take votes
- *FSC has good tools*, which
  - equals 1 if the FSC has either hard or semi-hard tools
  - equals 0 if the FSC has neither of these two types of tool

F-Stat for clusters = 47.14



Characteristics of clusters in the FSC ability to act dendrogram

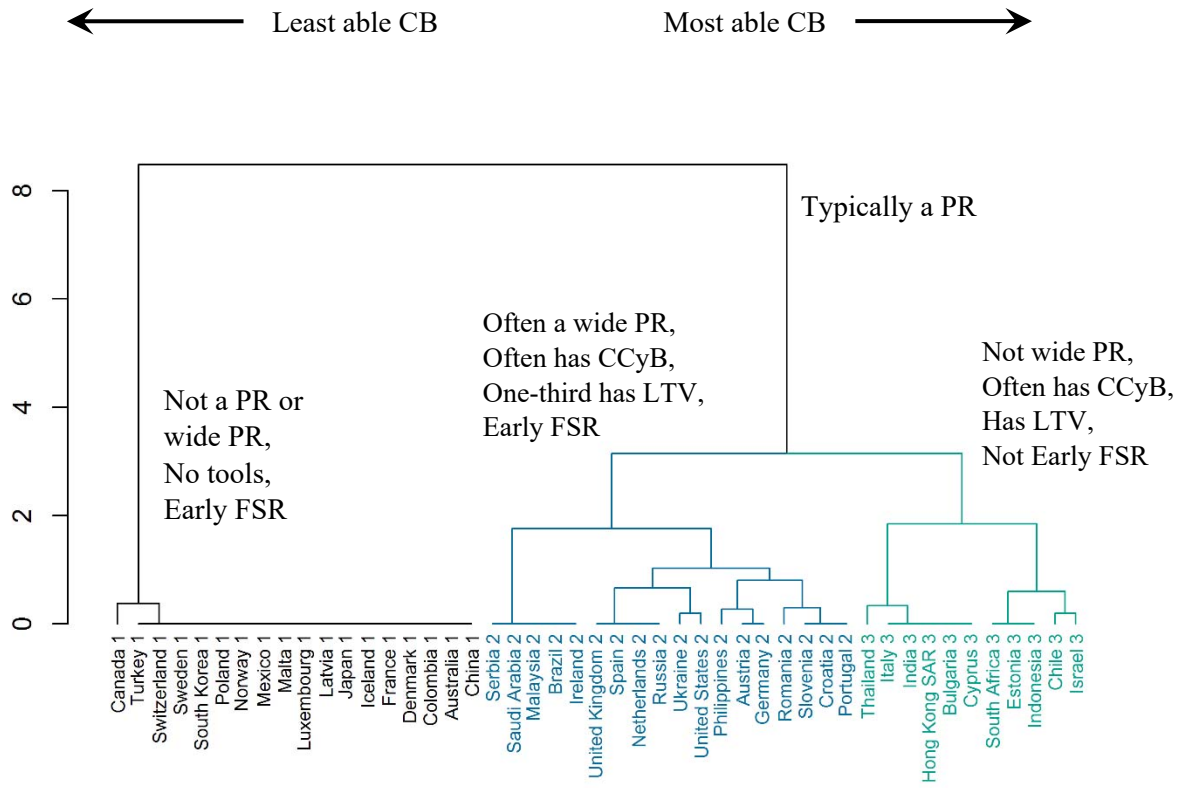
	Least able			Most able
	Olive (4)	Red (1)	Teal (3)	Blue (2)
A. Dendrogram info. & avg. values of variables				
No. of countries	10	13	12	12
Within (cluster) sum of squares (WSS)	3.4	0.9	3.9	0.0
Between (cluster) sum of squares (BSS)	8.8	5.0	3.8	10.2
Formal FSC	0.1***	1***	0.75***	1***
Single chair	0.5***	1***	0.83***	1***
FSC votes	0***	0***	1***	1***
Good tools	0***	0.08***	0***	1***
B. Average values of other FSC variables				
CB is chair	0.20	0.31	0.50	0.50
MoF is chair	0.30	0.62	0.50	0.58
CB and MoF are members	0.80	1.00	0.67	0.83
Indep. members on FSC	0**	0.08**	0.08**	0.42**
No. agencies on FSC	3.40	4.31	4.00	4.08
C. Avg. values of other pru.. gov. variables				
CB is PR	0.60	0.54	0.42	0.58
CB is wide PR	0.30	0.23	0.17	0.25
CB has CCyB	0.40	0.46	0.67	0.42
CB has LTVs	0.50	0.38	0.50	0.08
PR has CCyB	0.20	0.38	0.25	0.42
PR has LTVs	0.00	0.23	0.08	0.17
MoF or other has CCyB	0.20	0.00	0.00	0.17
MoF or other has LTV's	0.20	0.23	0.08	0.17
Early FSR	0.70	0.69	0.92	0.92
D. Average values of other governance variables				
CB political independence	0.53	0.58	0.61	0.75
CB operational independence	0.76	0.72	0.76	0.87
Rule of law	1.06**	0.35**	0.44**	1.32**
Checks and balances	0.64*	0.58*	0.64*	0.79*
E. Avg. values of economy variables				
Log GDP (2007)	26.78	26.60	26.19	26.69
Cov(GDP) (2007)	0.17	0.18	0.19	0.16
Per-capita GDP (2007)	40.2***	22.3***	20.92***	41.0***
Private credit-to-GDP (2007)	111.97	82.63	84.14	120.88
Log capital inflows-to-GDP (2007)	2.84	2.85	2.65	3.64
Nunmber of crises	0.80	1.31	1.17	1.17
Financial development index	0.72*	0.56*	0.53*	0.72*
Financial institutions development index	0.72*	0.57*	0.62*	0.78*
Financial markets development index	0.72*	0.53*	0.44*	0.66*

Figure 4. **CB ability to act dendrogram and characteristics of clusters (for countries with FSCs))**

Dendrogram based on:

- *CB is a PR*, which
  - equals 1 if the CB is a bank prudential regulator
  - equals 0 if the CB is not a bank prudential regulator
- *CB is a wide PR*, which
  - equals 1 if the CB is the prudential regulator of more than just banks
  - equals 0 if the CB is not a prudential regulator or just regulates banks
- *CB has CCyB*, which
  - equals 1 if the CB has authority for setting the CCyB
  - equals 0 if the CB does not have authority for setting for the CCyB
- *CB has LTV*, which
  - equals 1 if the CB has authority for setting LTV ratios
  - equals 0 if the CB does not have authority for setting LTV ratios
- *CB early FSR*, which
  - equals 1 if the CB was publishing an FSR before its FSC was formed
  - equals 0 if the CB does not publish an FSR or started publishing it after its FSC was formed

F-Stat for clusters = 30.49



Characteristics of clusters in CB ability to act dendrogram (for countries with FSCs)

	Least able		Most able
	Black (1)	Blue (2)	Teal (3)
A. Dendrogram info. & avg. values of variables			
No. of countries	18	18	11
Within (cluster) sum of squares (WSS)	0.9	12.6	7.5
Between (cluster) sum of squares (BSS)	13.1	8.8	7.2
Early FSR	0.94***	0.89***	0.45***
CB has CCyB	0***	0.83***	0.73***
CB has LTVs	0***	0.33***	1***
CB is PR	0***	1***	0.64***
CB is wide PR	0***	0.61***	0***
B. Average values of FSC variables			
Formal FSC	0.72	0.83	0.64
Single chair	0.94	0.72	0.91
FSC votes	0.44	0.67	0.36
Good tools	0.28	0.39	0.09
CB is chair	0.39	0.44	0.27
MoF is chair	0.67**	0.28**	0.64**
CB and MoF are members	0.83	0.78	0.91
Independent members on FSC	0.11	0.17	0.18
C. Avg. values of other pru.. gov. variables			
PR has CCyB	0.67***	0.11***	0***
PR has LTVs	0.28*	0.06*	0*
MoF or other has CCyB	0.22**	0**	0**
MoF or other has LTV's	0.33*	0.11*	0*
D. Average values of other governance variables			
CB political independence	0.58*	0.73*	0.5*
CB operational independence	0.91***	0.72***	0.66***
Rule of law	1.1*	0.61*	0.5*
Checks and balances	0.69	0.67	0.59
E. Avg. values of economy variables			
Log GDP (2007)	26.66	26.80	25.99
Cov(GDP) (2007)	0.18	0.17	0.19
Per-capita GDP (2007)	36.7	29.39	22.36
Private credit-to-GDP (2007)	109.33	91.96	93.71
Log capital inflows-to-GDP (2007)	3.14	2.99	2.81
Number of crises	1.11	1.28	0.91
Financial development index	0.69	0.62	0.54
Financial institutions development index	0.72	0.66	0.60
Financial markets development index	0.65	0.57	0.48

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	

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