Financial Stability Governance and Central Bank Communications*

Preliminary version. Please do not quote

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Abstract

We investigate how differences in governance frameworks across central banks explain their financial stability communication strategies and the effectiveness of these strategies at preventing the deterioration of financial cycle characteristics. We propose a simple conceptual framework that explains how central banks conduct their communication strategy, which eventually plays a role in the evolution of the financial cycle. To empirically validate our framework, we use a database with the financial stability governance characteristics of 24 central banks and the sentiment conveyed in the financial stability reports published by these central banks. We find that communications by central banks participating in an interagency financial stability committee or with a financial supervisory role are relatively more effective at alleviating the deterioration of financial conditions and at preventing potential financial stability events. We also find that, after observing a deterioration of financial conditions, central banks participating in financial stability committees or with an oversight role transmit a calmer message than banks without these characteristics, among other things because they have policy tools other than communication.

JEL Classification: G15, G28.
Keywords: Financial stability, Central bank communications, Governance, Text analysis.

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1. Introduction

After the global financial crisis of 2008-09, many countries took steps to enhance the resilience of the financial sector and prevent the build-up of vulnerabilities. Many countries decided to strengthen their macroprudential regulatory frameworks (Edge and Liang, 2017) and many central banks obtained a more explicit financial stability mandate or incorporated financial stability objectives more specifically in their monetary policy decision making process (Jeanneau, 2014). With these changes, financial stability assessments became an important task for central banks and communication an additional tool to influence financial agents behavior(Born et al., 2014). However, although the literature on monetary policy communications is large (see, for instance, Blinder et al., 2008; Ericsson, 2016; and Stekler and Symington, 2016), central banks' communications on financial stability have garnered less attention. Moreover, the interaction between financial stability communications and central banks' governance and oversight frameworks remains, to the best of our knowledge, unexplored in the literature.

In this paper, we explore how variations in governance frameworks among central banks relate to their financial stability communication strategies and the relative effectiveness of these communications in preventing a deterioration in financial vulnerabilities. To do so, we create a database detailing the governance and oversight frameworks of 24 countries' central banks.[1] For each central bank, we collect information on whether the central bank participates in an official or de facto interagency financial stability committee; whether this committee has authority to use macroprudential or related policy instruments; whether the central bank has a financial stability mandate; and whether the central bank has a role in supervising financial institutions (see Correa et al., 2017a). We use text analysis techniques to determine the sentiment conveyed by communications used by central banks to transmit

[1]This database is part of a research project that includes two other papers. One, Correa et al. (2017a), describes the database. The other, Edge and Liang (2017), examines which governance characteristics are more effective when undertaking macroprudential policy.

their assessment of the vulnerabilities of the financial sector. In particular, we extend the database of financial stability reports (FSRs) and the financial stability sentiment (FSS) conveyed in these reports constructed by Correa et al. 2017c (CGLM hereafter).

To understand how governance frameworks might interact with central banks' communication strategies, we propose a simple conceptual framework. We start from the assumption that the central bank uses private and public information to form an assessment of current financial vulnerabilities and how these vulnerabilities might evolve in the future. Depending on the central banks characteristics, including how it fits in the country's macroprudential governance framework, as well as its independence, transparency, and resources, the central bank then decides both its communication strategy and whether or not to adjust its policy instruments, such as macroprudential measures or monetary policy. Finally, financial vulnerabilities evolve depending on initial conditions and the central bank's communication strategies and policies. For simplicity, financial vulnerabilities can evolve only into two possible states, one of which implies a financial crisis and the other a turning point in the financial cycle. The goal of the central bank is to prevent the occurrence of a crisis by using its full set of tools, of which we focus on the role of financial stability communication.

To assess how differences across countries in governance and oversight frameworks affect communication strategies, we use a panel-data regression setting. We allow for cross-country heterogeneity in how the FSS conveyed by central banks' communications affects the evolution of financial cycle characteristics, our proxies for financial vulnerabilities, by interacting governance and oversight characteristics with the sentiment conveyed. We find that central banks participating in interagency financial stability committees or with an oversight role are relatively more effective in limiting a deterioration of financial cycle characteristics than those without these characteristics.

We next explore whether the effect of central banks' communications varies around turning points in the financial cycle. We find that central banks participating in interagency financial stability committees are even more effective in alleviating a deterioration of finan-

cial cycle conditions right before crises compared to other central banks. Using a Probit estimating equation, we next assess how governance characteristics relate to the predictive power of central banks' communications for turning points. We find that for central banks that are not part of an interagency financial stability committee, a deterioration in the communicated sentiment helps to predict turning points in the financial cycle—a one-percent increase in the FSS (i.e., deterioration in sentiment) of these central banks is followed by a 24 to 32 percent higher probability of a turning point. In other words, only central banks without these governance characteristic "cry wolf" and the "wolf actually comes". For central banks that are part of a committee, FSS does not usefully predict turning points. This may reflect the limitation of our identification strategy, as turning points are not observed for those central banks that are very effective at preventing turning points.

We then investigate what drives the relative effectiveness of communication by exploring whether governance frameworks matter for how central banks incorporate information in their financial stability communications. We find that, after observing a deterioration in financial conditions, central banks participating in financial stability committees or with an oversight role transmit a calmer message than banks without these characteristics. This evidence suggests that communication strategies differ based on the macroprudential governance framework of each country.

We explore one potential explanation for why transmitting a calmer message might be the result of more effective communication, namely that central banks communicate and act coherently by using other instruments at their disposal. Specifically, we assess whether the sentiment conveyed in financial stability reports, the FSS, is associated with either the evolution of the cumulative macroprudential index collected by Cerutti et al. (2016) or with the monetary policy rate. We would expect that the sentiment of central banks that can influence, directly or indirectly, macroprudential actions should be positively correlated with such actions. Consistent with this setting, we find that a deterioration in sentiment conveyed by central banks participating in interagency financial stability committees with authority

for macroprudential or related policy instruments is indeed followed by the implementation of more macroprudential policies. However, this effect only holds outside of crises. Thus, outside of crises central banks' communication is "coherent" with macroprudential actions, as a deterioration in sentiment is followed by relatively stricter macroprudential policies, while before crises a deterioration is followed by relatively looser macroprudential policies. The evidence on "coherence" for interest rates is less obvious, in that a deterioration in sentiment is followed by lower interest rates, irrespective of the governance characteristic considered. However, the effect of FSS on policy rates changes when we take into account turning points in the financial cycle. In particular, central banks that are members of financial stability committees with macroprudential instruments implement tighter monetary policy following a deterioration in sentiment before crises compared to others. This result may be interpreted as a last resort action by central banks to curtail vulnerabilities in the financial system prior to a turning point. Monetary policy may play a role if all the other measures used are ineffective (Stein, 2019).

This paper combines two strands in the literature, that on financial stability governance frameworks and that on central bank communication. The literature on central banks' financial stability governance frameworks and related use of macroprudential policies has gained much academic interest after the global financial crisis (see Edge and Liang, 2017; Masciandaro and Volpicella, 2016; and papers cited therein). However, the literature on central banks' communication strategies and the interactions with their characteristics has mostly focused on the role of transparency for communicating monetary policy (see, for instance, Morris and Shin, 2002; Ehrmann and Fratzscher, 2007; Blinder et al., 2008; and Cukierman, 2009). Some newer studies have explored other aspects of the sentiment conveyed in these communications and how they can spillover across countries (Armelius et al., 2018), but the literature is still developing.

The literature on financial stability communications has been mostly descriptive (see, for instance, Allen et al., 2004; Cihak, 2006; and Cihak et al., 2012), and only a few papers have

explored the effect of central banks' financial stability communications on financial cycle characteristics. Osterloo et al. (2011) explore the effect of the publication of FSRs on a set of business and financial cycle characteristics, while Harris et al. (2019) analyze the impact the Bank of England's FSR publication on stock returns and CDS spreads. Born et al. (2014) and CGLM use text analysis techniques to estimate the sentiment conveyed by central banks' financial stability communications and to investigate the effect of sentiment on financial cycle characteristics. footnoteWhile Born et al. (2014) use Diction, a general-purpose text analysis dictionary, to extract the sentiment conveyed by these communications, CGLM construct a dictionary tailored to the financial stability context, as they find that a large portion of words in FSRs convey a different sentiment when used in a financial stability context. CGLM use their financial stability dictionary to calculate a financial stability sentiment (FSS) index as the relative proportion of negative to positive words in FSRs. CGLM show that sentiment deteriorates—FSS increases—around the peak of the global financial crisis and around key episodes related to the euro-area sovereign debt crisis. They also show that a deterioration in financial cycle characteristics is followed by a deterioration in sentiment, which implies that central banks are able to incorporate developments in the financial cycle in their financial stability communications. They also show that the FSS index is a useful predictor of banking crises as sentiment deteriorates just prior to the start of a crisis. This does imply that financial stability communication alone is not sufficient to avoid a deterioration in financial vulnerabilities.[2]

To the best of our knowledge, this is the first paper to evaluate the interaction between financial stability governance frameworks and central banks' communication strategies. It can help explain why for instance central banks without a direct prudential oversight role might rely more on communication to transmit concerns about financial stability than central banks with direct tools for bank supervision as they cry wolf for another agency to act. It

[2]There is an increasing number of studies that use textual information to complement numerical indicators in models designed as early warning systems. For example, Huang et al. (2019) use the text from the Financial Times in a model to predict financial crises.

also suggests that, given their governance and oversight framework, those central banks with access to more detailed information about the conditions of the financial system, might decide to transmit a message that conveys the system's resilience following an adverse shock.

The rest of the paper is organized as follows. Section 2 develops a simple conceptual framework to understand the interaction between governance frameworks and central banks' communication strategies. Section 3 provides our empirical evidence regarding the role of governance frameworks in explaining the effectiveness of central banks' financial stability communications. Section 4 explores differences in communication strategies, including in relation to the use of financial cycles indicators and implementation of macroprudential and monetary policy tools. Section 5 concludes.

2. Understanding central banks' communication strategies

In this section, we propose a simple conceptual framework to understand the interaction between central banks' governance frameworks and their communication strategies. The proposed framework is a three-period model, with its main intuition summarized in figure 1. In the first period, t, the central bank observes the initial financial cycle condition, forms its expectations about the evolution of the financial cycle, and decides its general communication strategy. In the second period, $t + l$, the central bank communicates its views about the current financial conditions and, potentially, about the evolution of the financial cycle.

Besides financial stability communication, the central bank might in period $t + l$,also use other policy tools, including conventional and unconventional monetary policies and macroprudential tools. In the final period, $t + h$, financial stability conditions evolve depending on initial financial stability conditions, the decisions made by the central bank, and shocks to the financial cycle. For simplicity, we assume that there are only two possible states in period $t + h$, a good state, which occurs with probability π, and a bad state, or financial crisis or a turning point in the financial cycle, which occurs with probability $1 - \pi$. The goal of the central bank is to decide the optimal mixture of tools, including financial stabil-

ity communication, that minimizes the probability of the bad state. We now provide more details about the model.

In the first period, t, there is a set of financial cycle characteristics observed by the central bank of country i, $FS_{i,t}$. The set of conditions observed by the central bank includes not only the information that is available to the public, I_t^{public}, but also information available exclusively to the central bank, $I_t^{private}$, such as information obtained directly from financial institutions for supervisory purposes. Based on the financial conditions observed, the central bank will form expectations about the evolution of the financial cycle. In particular, the central bank will determine its expectations about time-h (final) financial cycle conditions,

$$E_{i,t}^{CB}(FS_{i,t+h}) = F_i^{CB}(I_{i,t}^{public}, I_{i,t}^{private}, C_{i,t}),$$

where C_t is a set of characteristics of the country's central bank, including its governance framework, transparency, level of independence, credibility, and resources.

In the second period, the central bank uses communication strategically to reveal some of its assessment of current financial conditions, $FSS_{i,t+l}$, and, potentially, about the evolution of the financial cycle, $FSS_{i,t+h}$. Both $FSS_{i,t+l}$ and $FSS_{i,t+h}$ depend on the set of information available to the central bank and on the central bank's characteristics,

$$FSS_{i,t+l} = F^{current}(I_{i,t}^{public}, I_{i,t}^{private}, C_{i,t}), \tag{1}$$

$$FSS_{i,t+h} = F^{future}(I_{i,t}^{public}, I_{i,t}^{private}, C_{i,t}). \tag{2}$$

These assessments become part of the information set available to the public at time l, I_{t+l}^{public}. These assessments, however, might differ from $FS_{i,t}$ and $E_{i,t}^{CB}(FS_{i,t+h})$, respectively. That is, the central bank does not necessarily reveal (all) the private information it observes about current financial cycle conditions nor its (full) expectations about the evolution of the financial cycle.

There are three main reasons why $FSS_{i,t+l} \neq FS_{i,t}$ and/or $FSS_{i,t+h} \neq E_{i,t}^{CB}(FS_{i,t+h})$.

The first one is institutional: the central bank does not reveal transparently because it is not fully independent or has other limits on full transparency[SC3] (for example, legally it cannot reveal certain, institution-specific information). The second one is strategic: the central bank questions the value of full transparency, for example, it has private information that points to a deterioration in financial stability conditions beyond what the set of information available to the public suggests, but revealing this private information could simply accelerate or exacerbate the occurrence of the bad state, eg lead to a financial crisis (see Cukierman, 2009). The third reason is about coherence in communication given the confidence it has: the central bank believes it has the tools to prevent a financial crisis (or financial boom) and is willing to use them, so it decides to transmit a message of calm even in the face of a deterioration (loosening) in financial conditions. The first reason could make for a systematic bias or more noisy communication, the second would create a specific asymmetry, and the third reason could create a link between the bank's communication and its other tools.

Final financial cycle conditions, FS_{t+h}, are then a function of time-t conditions, the set of tools implemented by the central bank at time $t+l$, including its communication strategy, and shocks to financial stability, $z_{i,t+h}$:

$$FS_{i,t+h} = F(I_{i,t}^{public}, I_{i,t}^{private}, FSS_{i,t+l}, C_{i,t}) + z_{i,t+h}. \tag{3}$$

We assume that in terms of financial stability, that is, setting aside its other mandates, the central bank's problem is to decide its communication strategy, $FSS_{i,t+l}$ and $FSS_{i,t+h}$, such that it minimizes π, the probability of a financial crisis. Our simple framework then implies that the central bank's communication strategy, and how effective this strategy is at preventing the deterioration of financial cycle conditions and even financial crises, will differ by a number of central bank characteristics, including its governance framework. In the following section, we formulate a set of hypotheses from the model and test them empirically.

3. The effectiveness of financial stability communication

In this section, we follow the intuition from the conceptual framework introduced in section 2, and explore whether the effectiveness of central banks' communications depends on their governance frameworks. In the first part of the section, we introduce the data. Then, we identify those features of the central banks governance frameworks that yield communication strategies that are relatively more (or less) effective in alleviating the deterioration of financial cycle characteristics and the risks of a financial crisis.

3.1. Data

We use a panel dataset consisting of 24 countries for the sample period running from 2005 to 2017. For each country, we characterize central banks' financial stability communications using the FSS index as developed in CGLM. For each FSR, the FSS index is calculated as follows:

$$FSS\ index_{country,period} = \frac{\#Negative\ words - \#Positive\ words}{\#Total\ words}, \tag{4}$$

where the negative or positive connotation of words is obtained from the financial stability dictionary proposed by these authors.[3] Although there are more central banks publishing FSRs, we restrict our sample to those central banks publishing at least one FSR annually since 2005. As pointed out by CGLM, working with this reduced sample has two main advantages. First, it allows us to compare the indexes for a homogeneous time period. Second, it increases the reliability of our empirical exercises, because most countries not included in our sample began publishing FSRs only around the GFC.

Panel A of figure 2 shows the time series for the cross-country average of the demeaned FSS indexes. The average FSS increased (that is, sentiment deteriorated) in the period around the failure of Lehman Brothers in September of 2008, and then again before the approval of the second EU-IMF bailout for Greece in the first quarter of 2012.

[3]The dictionary can be found in the online appendix of Correa, Garud, Londono, and Mislang (2017b).

Table 1 summarizes the governance framework characteristics for the central banks of the countries in our sample. We center our attention on a subset of the characteristics in the governance framework database in Correa et al., 2017a. These characteristics are: (i) whether the central bank participates in an interagency financial stability committee; (ii) whether the central bank has been given a financial stability mandate; and (iii) whether the central bank has oversight powers for banks domiciled in the country. The table also includes the date(s) for whenever changes in each characteristic occurred within our sample period.[4]

Panels B to D of figure 2 show the time series of cross-country averages FSS indexes for central banks with and without each of the governance characteristics in table 1. These panels provide the main intuition for the difference in communication strategies and the effectiveness of communication across central banks depending on their governance frameworks. It shows that the central banks participating in financial stability committees and with financial stability mandates and oversight tend to have somewhat more pronounced movements in their FSS than those central banks without these characteristics. [SC1]

Table 2 shows a set of publicly-available variables characterizing financial conditions in each country. To assess the effectiveness of financial stability communications, we use the following variables related to credit growth: the credit-to-GDP gap, the annual growth in credit to the nonfinancial private sector to GDP, and the debt-service ratio. While these credit growth measures slow-moving variables (compared to asset prices), we also explore other variables characterizing asset valuations and systemic risk which display more time variation. The latter variables are used to explore communication strategies in section 4.

Tables 3, 4, and 5 show, respectively, a set of summary statistics for the credit-to-GDP gap, the annual growth in total credit, and the debt-service ratio, our benchmark measures of financial conditions in each country (see Borio, 2014 and 2). As can be seen in table 3, although, by construction, the average gap approaches zero for longer samples, there is

[4]In section 4, we also consider whether central banks participate in interagency committees with the power to implement policy tools, including macroprudential tools. However, this sample is quite small. Specifically, except for Hong Kong, this characteristic is only observed for some central banks and very recently so.

substantial heterogeneity in the mean gap for the countries in our sample. The mean gap ranges from -8.77 (the United Kingdom) to 22.88 (Hong Kong). The volatility of the gap (St. Dev.) provides a general picture of the variation in the financial cycle, while the minimum and maximum values give an idea of the peaks and troughs of each country's financial cycle and the severity of crises. Standard deviations range from 2.85 (Germany) to 27.5 (Hong Kong). The lowest credit gap is observed for Spain (-50), while the maximum one is observed for Hong Kong (48.9).

We calculate a dummy to characterize turning points in the financial cycle. This dummy takes the value of 1 whenever there is a turning point (local maximum) in the credit-to-GDP gap that is followed by a decline in the gap over at least the next four quarters and zero otherwise. The last column of table 3 provides information on how frequent these turning points are in each country in our sample. Interestingly, for our sample (52 quarters in total), there are no credit-to-GDP gap turning points in Germany. In contrast, there are 13 turning points in the Czech Republic, the highest number.

The statistics in table 4 also suggest that there are important differences in the dynamics of credit growth among the countries in our sample. The mean annual growth ranges from -2.41 (Argentina) to 11.29 (Turkey) percent, and credit growth volatility ranges from 2.19 (Switzerland) to 11.34 (Turkey) percent.

As can be seen in table 5, the debt-service ratio is available for a much smaller sample of countries. Specifically, this characteristic is not available for Argentina, Austria, Chile, Hong Kong, New Zealand, and Singapore. For the countries with data available, the average debt-service ratio ranges from 3.72 (Indonesia) to 26.73 (Norway) percent. Compared to the other two characteristics of the financial cycle, the debt-service ratio is less volatile, with its standard deviation ranging from 0.53 (Indonesia) to 3.13 (Spain) percent.

3.2. FSS and the evolution of the financial cycle

We now investigate how macroprudential governance frameworks are related to the relative effectiveness of central banks' communications. In particular, we explore how these governance characteristics relate to the heterogeneity in the effect of financial stability communications on the (four-quarters-ahead) evolution of the financial cycle. We do this using the following panel-data regression setting:

$$FS_{i,t+4} = \alpha_i + \alpha + (\beta_1 + \beta_2 D_{i,t-1}) FSS_{i,t} + \gamma FS_{i,t} + e_{i,t+h}, \tag{5}$$

where FS_t is one of the financial cycle characteristic related to credit in tables 3 to 5, $D_{i,t}$ is a dummy that takes the value of 1 when the country's central bank has one of the characteristics in the governance framework database (see table 1) and zero otherwise, and FSS_t is the financial stability sentiment index. The dummy for the governance characteristic is lagged to control for potential erogeneity between FSS_t and D_t (although, as noted, the time variation is small for some characteristics). Equation (5) is the empirical counterpart to equation (3) in the conceptual framework introduced in section 2, where we allow the functional form F for the effect of central banks' communications on future financial conditions to depend on governance frameworks.

Table 6 provides the evidence for the role of governance characteristics in explaining the different effects of financial stability communication on four-quarters-ahead credit-to-GDP gap (panel A), annual credit growth (panel B), and debt-service ratio (panel C). The evidence in panel A shows that the effect of FSS for four-quarters-ahead credit-to-GDP gap is statistically not significant when we exclude macroprudential governance characteristics. The other regression results suggests, however, that financial stability communication by central banks participating in an interagency financial stability committee is relatively more effective at reversing the deterioration of the credit-to-GDP gap. Specifically, the estimate of the coefficient associated with the committee dummy, β_2, is negative and significant at

the 5 percent confidence level. Moreover, the estimated coefficient for the effect of FSS for central banks with a committee, $\beta_1 + \beta_2$, is negative and significant at the 10 percent confidence level. This evidence suggest that a deterioration in financial stability sentiment is followed by an improvement (i.e., a decrease) in credit-to-GDP gap for those countries in which the central bank participates in a financial stability committee, while the effect of FSS on credit-to-GDP gap is not significant for central banks that are not members of a financial stability committees. When we explore the effect of having multiple characteristics, we find that the estimate of β_2 is statistically significant only for central banks that simultaneously participate in a financial stability committee and have a financial stability mandate. Estimates of the coefficients associated with the additional, β_2, and the total, $\beta_1 + \beta_2$, effect of all other governance characteristics (individually or jointly) are statistically insignificant. This evidence suggests that the effect of FSS for the evolution of four-quarters ahead credit-to-GDP gap does not depend on any of these governance characteristics.

Panel B of table 6 summarizes the results for the growth in total credit to the private nonfinancial sector to GDP, another measure of the evolution of the financial cycle. This measure allows us to avoid potential drawbacks of the credit-to-GDP gap, including the method used to calculate the gap. The results, however, follow very similar patterns to those documented in panel A. Specifically, a deterioration in financial stability sentiment is followed by a significant decrease in credit growth only for those central banks participating in interagency financial stability committees.

Panel C of table 6 summarizes the results for the debt-service ratio. The results for the effect of sentiment in financial stability reports published by central banks in a committee are robust to this financial cycle measure. Interestingly, for this alternative financial cycle measure, an oversight role also matters. In particular, FSS for central banks with an oversight role has a significant and negative effect for the four-quarters-ahead debt-service ratio.

3.3. FSS around turning points in the financial cycle

We now explore whether the interaction between governance characteristics and financial stability communication changes around turning points in the financial cycle and the extent to which this makes some central banks relatively more effective at preventing these turning points.

We first explore whether the patterns documented in table 6 change around financial crises. To do so, we use the following panel-data regression setting:

$$FS_{i,t+4} = \alpha_i + \alpha + (\beta_1 + \beta_2 D_{i,t-1} + \beta_3 TP_{i,t+4} + \beta_4 D_{i,t-1} TP_{i,t+4}) FSS_{i,t} + \gamma FS_{i,t} + e_{i,t+4}, \quad (6)$$

where $TP_{i,t}$ is a dummy that takes the value of 1 when there is a turning point in credit-to-GDP gap followed by a decrease in the gap over at least the next four quarters (see table 3). Our regression setting does not assume perfect foresight of turning points, but rather explores, from the econometric point of view, whether communication is more effective before these turning points, which is why TP is included contemporaneously to the left-hand-side variable.

Panel A of table 7 summarizes the results for the effects of FSS for the credit-to-GDP gap. An interesting result is the positive and significant estimate of β_3, the coefficient associated with TP for central banks without any of the financial stability governance characteristics. This result implies that financial stability sentiment for central banks without any of the characteristics is a better predictor of the evolution of the credit-to-GDP gap before a turning point. Indeed, a deterioration in sentiment is followed by a deterioration in credit-to-GDP gap. In other words, central banks without any of these characteristics do signal concerns ("cry wolf") before crises but are unable to prevent a further deterioration of the financial cycle. Another finding is that the results for the interaction between FSS and the committee dummy documented in table 6 hold, in that central banks in interagency financial stability committees are relatively more effective at alleviating the deterioration of the credit-to-GDP

gap; that is, $\beta_2 + \beta_4$ is negative and statistically significant. Interestingly, the coefficient associated with the interaction between FSS, TP, and D becomes positive and significant for central banks with a financial stability mandate, which suggests that such central banks are relatively better at predicting the evolution of the credit-to-GDP gap before turning points. For central banks that simultaneously have a financial stability mandate and participate in a financial stability committee, the estimate of β_4 becomes negative and insignificant, suggesting that sentiment in reports published by such central banks has an additional "alleviating" effect for credit-to-GDP gap before turning points. However, the result for banks with a financial stability mandate should be taken with much caution, as all countries in our sample but Poland have a financial stability mandate.

The evidence in panels B and C of table 7 confirm the main results. On the one hand, a deterioration in sentiment by central banks without any of the financial stability governance characteristics is followed by a significant deterioration of credit growth and the debt-service ratio only before turning points. On the other hand, communication by central banks in a financial stability committee is relatively more effective at preventing the deterioration in financial cycle conditions.

To investigate further the effectiveness of central banks' communications around turning points in the financial cycle, we use the following Probit regression setting:

$$Pr[TP_{i,t+4} = 1] = \Phi[X_{i,t}\beta], \tag{7}$$

where $X_{i,t}$ contains the FSS index and a set of control variables. This setting poses an econometric challenge, namely, that in both the case of a very "effective" central bank or of a "lucky" central bank countries should not experience financial crises. Either one could be, for instance, the case of Germany, which did not experience turning points in credit-to-GDP gap in our sample period.

Table 8 summarizes the results for the regression setting in equation (7). The results show that an increase in the financial stability sentiment conveyed by central banks without any

of the governance characteristics is followed by a higher probability of a turning point in the financial cycle. This evidence is consistent with that in table 7; that is, central banks without these characteristics cry wolf and the probability of a turning point in the financial cycle is higher. Although the coefficient associated with FSS is often negative—i.e., a deterioration in sentiment lowers the probability of a turning point in the cycle—for central banks with some of these characteristics, it is never statistically significant at standard confidence levels. The results for central banks with these characteristics could be due to the identification problem mentioned earlier when turning points are not observed. The evidence in table 8 also suggests that the results in CGLM, where it was found that central banks' communication is a useful predictor of crises and turning points in the financial cycle, seem to be driven mostly by central banks not participating in a committee, without a financial stability mandate, or without an oversight role.

4. Communication strategies

In this section, building on the intuition from the conceptual framework in section 2, we explore the extent to which governance frameworks determine central banks' communication strategies. In the first part, we investigate whether central banks convey information from financial cycle indicators differently depending on their governance framework characteristics. In the second part, we investigate whether the differences in how central banks communicate relate to their ability to implement macroprudential policy tools or to change the monetary policy stance, that is, whether the sentiment in financial stability reports is followed by policy actions.

4.1. How are financial conditions reflected in FSS?

In section 3, we show that some governance characteristics yield relatively more effective financial stability communication. We now explore why some communication strategies might be more effective than other at preventing the deterioration of financial cycle characteristics.

To do so, we use the following panel-data regression setting:

$$FSS_{i,t+1} = \alpha_i + \alpha + (\beta_1 + \beta_2 D_{i,t-1})X_{i,t} + \gamma FSS_{i,t} + e_{i,t+1}, \tag{8}$$

were $X_{i,t}$ is one of the financial stability indicators in table 2. This setting is the empirical counterpart of equation (1) in our conceptual framework in section 2. Because the FSS index is interpolated using a step function when FSRs are available for frequencies lower than 4 quarters, the one-quarter-ahead evidence is essentially a contemporaneous regression setting of how central banks incorporate financial cycle information in the sentiment conveyed in financial stability reports.

Table 9 reports the results of the regression setting in equation (8) for central banks participating in interagency financial stability committees (panel A) and with an oversight role (panel B). In section 3, we show that these two characteristics significantly drive the heterogeneous effects of FSS for the evolution of the financial cycle. The sign and significance of β_1 suggests that financial stability sentiment of central banks not participating in a committee or without an oversight role incorporate (near) contemporaneous information from the credit-to-GDP gap, the debt-service ratio, the SRIK-to-GDP ratio, and bank stocks' volatility. Specifically, a deterioration in these indicators is accompanied by a deterioration in FSS. Relative to these central banks, in contrast, sentiment in the reports by those participating in a committee or an oversight role deteriorates less following an increase in total credit, the debt-service ratio, an increase in property prices, and an increase in total credit. That is, for these indicators, coefficient β_2 is negative and significant.

Overall, our evidence suggests that central banks with a committee or with an oversight role choose a strategy in which, following a deterioration in some financial stability indicators, their financial stability sentiment deteriorates less than that of banks without a committee or without supervisory powers. This evidence is in line with the idea that central banks might decide not to be convey their assessment of current or expected financial conditions because of the following strategic considerations: (i) revealing private information might accelerate

the onset of a crisis, (ii) because they are confident about their ability to use tools to prevent financial crises, or (iii) because communication by itself is effective at turning around the deterioration of financial cycle characteristics.

4.2. Are words followed by action?

To explore some of the strategic considerations in financial stability communication, we show in table 10 the results using the following regression setting:

$$PA_{i,t+4} = \alpha_i + \alpha + (\beta_1 + \beta_2 D_{i,t-1}) FSS_{i,t} + \gamma PA_{i,t} + e_{i,t+h}, \tag{9}$$

where $PA_{i,t}$ is either the cumulative macroprudential policy index of Cerutti et al. (2016) (panel A) or the monetary policy rate (panel B) implemented by the country's central bank. In table 11, we explore whether the relation between the FSS and policy actions varies around crises by estimating the following regression:

$$PA_{i,t+4} = \alpha_i + \alpha + (\beta_1 + \beta_2 D_{i,t-1} + \beta_3 TP_{i,t+4} + \beta_4 D_{i,t-1} TP_{i,t+4}) FSS_{i,t} + \gamma PA_{i,t} + e_{i,t+4}, \tag{10}$$

where $TP_{i,t}$ is the dummy that indicates the occurrence of turning points in the credit-to-GDP gap.

The results in panel A of table 10 show the macroprudential policy index which is, by construction, very slow moving, to have a very high and significant autoregressive coefficient. It is, therefore, not surprising that the explanatory power of the FSS when all central banks are considered to be homogeneous turns out to be insignificant. Interestingly, however, for central banks not in a committee or without a financial stability mandate, the coefficient for FSS is negative and significant, which implies that a deterioration in sentiment is followed by a reduction in the number of macroprudential policies implemented. Communication by central banks with some of these governance characteristics appears relatively more "coherent," in the sense that a deterioration in sentiment is followed by implementing relatively more macroprudential policies. This result is stronger for central banks that participate in

committees with the ability to implement these policies. In fact, the coefficient associated with FSS for these central banks, $\beta_1 + \beta_2$, is only significant for central banks participating in an interagency financial stability committee with powers.

The results in panel A of table 11 suggest that the relation between FSS and the implementation of macroprudential policy tools varies around crises only for central banks in financial stability committees with powers. In particular, the estimate of β_4, the coefficient associated with the interaction between FSS, the governance characteristic, and the dummy for turning points, is negative and significant. In other words, relative to noncrisis episodes, a deterioration in sentiment is followed by the implementation of relatively fewer macroprudential policies. The evidence for the relation between FSS and the implementation of macroprudential tools then suggests that, relative to central banks not in committees, central banks in financial stability committees are relatively more coherent at implementing macroprudential tools only outside of crises; however, these central banks tend to implement relatively fewer macroprudential policies around crises.

The results in panel B of table 10 suggest that a deterioration in sentiment is followed by a reduction in monetary policy rates, irrespective of whether or not central banks have any of the governance characteristics. If anything, central banks in interagency financial stability committees reduce monetary policy rates even more than those not in a committee following a deterioration of sentiment. These results could be interpreted as lack of coherence between communication and actions, as monetary policy could be tightened to prevent a deterioration of financial cycle indicators. It could also indicate, however, that these central banks balanced financial stability concerns and monetary policy objectives using different tools.

The results in panel B of table 11 suggest that the evidence for monetary policy rates varies considerably around crises. In particular, a deterioration in the sentiment in financial stability reports published by central banks in committees with powers or with an oversight role is followed by a relative increase in monetary policy rates around crises. In fact, the coefficient associated with central banks without any of the characteristics, $\beta_1 + \beta_3$, re-

mains negative and significant, while the additional effect for banks in a financial stability committee with powers,$\beta_2 + \beta_4$, becomes positive and significant.

5. Conclusion

Macroprudential regulation and financial stability communication have gained prominence as part of the set of policy tools available to central banks worldwide. But the interaction between financial stability communications and central banks' governance and oversight frameworks remains mostly unexplored in the literature.

We investigate how differences in governance frameworks across central banks explain their different financial stability communication strategies and the effectiveness of these strategies in preventing turning points in the financial cycle. To do so, we first propose a simple conceptual framework to understand how central banks incorporate public and private information and decide their communication strategy, which then plays a role in the evolution of the financial cycle. Using a database of financial stability governance frameworks of 24 countries, we empirically test whether governance frameworks play a role in the effectiveness of financial stability communication strategies. We use the text in financial stability reports published by the cental banks in these countries to derive the sentiment in financial stability communications. We find that communication by central banks participating in an interagency financial stability committee or with an oversight role is relatively more effective at alleviating the deterioration in financial conditions and the occurrence of financial crises. We then investigate what drives the effectiveness of communication by exploring whether governance frameworks matter for how central banks determine their communication strategy. We find that, after observing a deterioration of financial conditions, central banks in financial stability committees or with an oversight role transmit a calmer message than banks without these characteristics. To understand why banks might decide to transmit a calmer message, we explore the coherence in their communication strategies with other policy actions by assessing whether a deterioration in sentiment is followed by the implementation

of other actions. We find that governance characteristics affect the coherence in financial stability communications.

Although we find preliminary evidence that communication by itself is effective at alleviating the deterioration of financial conditions, further research is needed to understand the factors behind these differences in communication strategies. For one, more research is needed to understand the interaction between governance characteristics and other central banks' characteristics, such as independence, resources, reliability, transparency, and communications. We leave these questions for future research.

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Table 1: Financial stability governance frameworks

This table summarizes the financial stability governance frameworks for the central banks of the countries in our sample. We also report the dates in which changes to these frameworks have occurred within our sample period. A more detailed description of this database can be found in Correa et al. (2017a), one of the papers of the research project associated with this database.

Country	Committee (Yes/No/ De facto)	Date	Financial stability mandate	Oversight	Date (year)
Argentina	N		Y	Y	
Australia	Y		Y	N	
Austria	Y	8-Sep-14	Y	Y	
Belgium	N	31-Jul-10	Y	Y	2011
Canada	D		Y	N	
Chile	Y	31-Jul-11	Y	N	
Czech Republic	N		Y	Y	
Denmark	Y	28-Feb-13	Y	N	
Germany	Y	31-Jan-13	Y	Y	
Hong Kong	Y		Y	Y	
Hungary	N[1]	16-Sep-13	Y	Y	2013
Indonesia	Y[2]	30-Dec-05	Y	N	2014
The Netherlands	N		Y	Y	
New Zealand	D	1-Jan-06	Y	Y	
Norway	Y[3]	1-Dec-08	Y	N	
Poland	N		N	N	
Portugal	N		Y	Y	
Singapore	N		Y	Y	
South Africa	D	1-Jun-08	Y	Y	
Spain	D	17-Jan-12	Y	Y	
Sweden	Y	19-Dec-13	Y	N	
Switzerland	D	23-Feb-10	Y	N	
Turkey	Y	8-Jun-11	Y	N	
United Kingdom	D[4]	28-Feb-11	Y	Y	2012

[1] De facto committee between 1/1/2010 and 09/16/2013. [2] Committee was de facto between 12/30/2005 and 11/30/2011. [3] Committee was de facto between 12/1/2008 and 11/01/2015. [4] Committee was de facto between 2/28/2011 and 12/19/2012.

Table 2: Financial cycle indicators, data sources and definitions

Variable	Description	Source	Units
Credit to GDP gap	Deviations of the credit to GDP ratio from its long-run trend (see Borio, 2014).	BIS	Percent
Total credit	Ratio of credit to the nonfinancial private sector to GDP	BIS	USD millions
DSR, private nonfinancial	Ratio of interest payments plus amortizations to income for private nonfinancial borrowers (see Drehmann et al., 2015).	BIS	Percent
SRISK to GDP	SRISK to GDP ratio. SRISK is the systemic risk measure in Brownlees and Engle (2016): Capital shortfall of the banking system conditional on a severe market decline. SRISK is aggregated at the country level and divided by nominal GDP.	V-Lab, NYU Stern	Percent
Bank CDS	Value-weighted average of the 5-year unsecured CDS spreads of a group of representative financial institutions.	Markit, Federal Reserve Board	Percent
Stock volatility	Quarterly realized volatility of the headline stock index. Quarterly volatility is calculated as the square of the sum	Bloomberg	Percent (annualized)
Bank CDS	Value-weighted average of the 5-year unsecured CDS spreads of a group of representative financial institutions.	Markit, Federal Reserve Board	Percent
Real property price	Log change in the BIS real property price index from last year.	BIS	Percent
Household credit	Total credit to households	BIS	USD millions

Table 3: Credit-to-GDP gap and financial cycle turning points, summary statistics

This table reports a set of summary statistics for the credit-to-GDP gap (see Borio, 2014) for the sample period running from January 2005 to December 2017. We also report the number of turning points in the credit-to-GDP gap, defined as local maximums followed by a decrease in the gap over at least the next four quarters.

Country	Mean	Median	St. Dev.	Min.	Max.	Turning points
Argentina	-5.11	-5.5	5.30	-12.7	3.3	3
Australia	2.19	1.8	10.61	-12.8	18.6	5
Austria	-3.77	-3.3	4.33	-11.2	1.6	6
Belgium	4.07	2.6	7.59	-8.4	23.0	7
Canada	6.16	7.1	7.05	-9.1	16.9	7
Chile	-0.98	0.0	11.69	-19.0	21.0	7
Czech Republic	10.61	13.1	5.23	0.2	17.2	13
Denmark	6.58	8.4	24.05	-35.8	34.5	6
Germany	-8.41	-7.5	2.85	-13.7	-3.0	0
Hong Kong	22.88	27.2	16.22	-3.8	48.9	11
Hungary	1.84	7.5	21.04	-32.6	39.7	7
Indonesia	2.58	3.1	8.23	-12.5	13.2	7
The Netherlands	-8.62	-8.1	7.17	-22.3	4.3	2
New Zealand	-6.21	-12.4	13.18	-22.2	13.6	3
Norway	10.65	8.6	8.63	-3.2	29.7	8
Poland	2.18	1.7	4.87	-6.1	15.7	6
Portugal	-1.83	5.0	22.67	-45.2	25.8	9
Singapore	4.76	2.9	14.59	-17.9	26.8	8
South Africa	1.59	-1.1	5.73	-4.8	13.0	4
Spain	-0.69	3.8	32.64	-50.0	42.2	3
Sweden	10.13	7.1	14.98	-12.6	40.8	7
Switzerland	2.88	6.2	7.50	-10.5	14.0	5
Turkey	9.65	10.3	3.92	-3.2	15.3	8
United Kingdom	-8.77	-11.6	15.24	-32.2	11.3	7

Table 4: Credit growth, summary statistics

This table reports a set of summary statistics for the annual growth in total credit to the private nonfinancial sector (relative to GDP) for the sample period running from January 2005 to December 2017.

Country	Mean	St. Dev.	Min.	Max.
Argentina	-2.41	6.96	-13.33	17.03
Australia	1.52	3.43	-5.16	6.80
Austria	0.44	2.02	-3.78	4.59
Belgium	3.00	4.55	-6.41	13.00
Canada	2.97	3.08	-2.24	10.90
Chile	3.42	6.81	-7.33	21.59
Czech Republic	3.55	4.58	-5.37	12.67
Denmark	1.26	4.24	-5.34	8.51
Germany	-1.22	2.48	-7.14	3.89
Hong Kong	5.13	5.45	-4.05	19.14
Hungary	0.58	8.92	-10.66	23.90
Indonesia	3.16	7.73	-13.49	17.33
The Netherlands	0.16	2.89	-4.54	8.41
New Zealand	0.52	3.56	-4.93	8.25
Norway	2.71	4.01	-4.38	10.15
Poland	5.89	7.30	-5.79	27.13
Portugal	-0.07	4.83	-7.60	7.57
Singapore	3.29	5.47	-7.15	14.27
South Africa	1.43	5.33	-6.39	14.19
Spain	0.13	6.00	-7.59	13.42
Sweden	3.07	4.97	-5.44	14.31
Switzerland	1.79	2.19	-2.72	8.00
Turkey	11.29	11.34	-1.70	53.16
United Kingdom	-0.08	3.35	-6.36	5.80

Table 5: Debt service ratio, summary statistics

This table reports a set of summary statistics for the debt service ratio for the sample period running from January 2005 to December 2017.

Country	Mean	St. Dev.	Min.	Max.
Argentina	NA	NA	NA	NA
Australia	21.32	1.13	19.40	24.40
Austria	NA	NA	NA	NA
Belgium	19.57	1.72	16.70	22.20
Canada	21.15	1.56	18.60	24.20
Chile	NA	NA	NA	NA
Czech Republic	7.18	0.72	5.70	8.20
Denmark	26.55	2.68	22.60	31.60
Germany	10.65	0.78	9.60	12.10
Hong Kong	NA	NA	NA	NA
Hungary	13.46	3.12	7.40	19.30
Indonesia	3.72	0.53	3.00	4.70
The Netherlands	24.72	0.95	22.80	26.30
New Zealand	NA	NA	NA	NA
Norway	26.73	2.38	21.60	30.00
Poland	7.18	1.02	5.10	8.40
Portugal	19.57	1.73	16.10	22.40
Singapore	NA	NA	NA	NA
South Africa	8.68	1.05	7.60	11.20
Spain	19.46	3.13	14.20	24.90
Sweden	21.13	1.67	18.30	23.70
Switzerland	16.82	0.70	15.20	17.60
Turkey	9.98	2.94	5.10	15.80
United Kingdom	17.35	1.74	14.90	20.60

Table 6: Governance frameworks and heterogeneous effects of FSS for financial cycle indicators

This table reports the results for the following panel-data regression setting:

$$FS_{i,t+4} = \alpha_i + \alpha + (\beta_1 + \beta_2 D_{i,t-1})FSS_{i,t} + \gamma FS_{i,t} + \beta_{\mathbf{4}}\mathbf{C_{i,t}} + e_{i,t+4},$$

where $FS_{i,t}$ is one of the following financial cycle indicators: the credit-to-GDP gap (panel A), the 4-quarters credit growth (panel B), and the debt-service ratio (panel C). $D_{i,t}$ is a dummy that takes the value of 1 when the country's central bank has one of the characteristics in the governance framework database and zero otherwise, and is lagged to control for endogeneity with $FSS_{i,t}$, the financial stability sentiment index calculated using the text in FSRs. Standard errors are corrected using Huber-White standard deviations (see Wooldridge, 2002), and are reported in parentheses. *,**, and *** represent the usual 10%, 5%, and 1% significance levels.

Panel A. Credit-to-GDP gap

	Homogeneous	Committee	Financial stability mandate	Oversight	Committee and oversight	Committee and no oversight	Committee and mandate	Committee and no mandate	Oversight and mandate
Constant	-0.25	-0.21	-0.29	-0.26	-0.28	-0.27	-0.24	-0.29	-0.26
	(0.55)	(0.48)	(0.54)	(0.54)	(0.52)	(0.53)	(0.50)	(0.54)	(0.54)
AR coefficient	0.87***	0.85***	0.86***	0.86***	0.86***	0.86***	0.85***	0.86***	0.86***
	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)
FSS (β_1)	-0.27	0.55	-0.68	-0.04	-0.14	0.09	0.21	-0.22	-0.02
	(0.59)	(0.69)	(1.40)	(0.62)	(0.59)	(0.65)	(0.63)	(0.60)	(0.60)
D*FSS (β_2)		-1.73**	0.45	-0.42	-0.73	-1.3	-1.22*	-0.61	-0.49
		(0.51)	(1.50)	(0.45)	(0.43)	(0.67)	(0.48)	(1.60)	(0.45)
$\beta_1 + \beta_2$		-1.19*	-0.23	-0.46	-0.87	-1.22	-1.02	-0.84	-0.51
		(0.48)	(0.60)	(0.62)	(0.61)	(0.66)	(0.56)	(1.55)	(0.64)
R^2	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69
N	1,544	1,522	1,522	1,522	1,522	1,522	1,522	1,522	1,522

Table 6: Governance frameworks and heterogeneous effects of FSS for financial cycle indicators, continued

Panel B. Credit growth

	Homogeneous	Committee	Financial stability mandate	Oversight	Committee and oversight	Committee and no oversight	Committee and mandate	Committee and no mandate	Oversight and mandate
Constant	1.87***	2.00***	1.87***	1.92***	1.88***	1.90***	1.93***	1.86***	1.93***
	(0.31)	(0.27)	(0.31)	(0.30)	(0.30)	(0.29)	(0.28)	(0.31)	(0.30)
AR coefficient	0.17*	0.14	0.17*	0.16*	0.17*	0.16	0.16	0.17*	0.16*
	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)
FSS (β_1)	-0.34	0.22	-1.66	-0.09	-0.28	-0.08	-0.08	-0.27	-0.04
	(0.33)	(0.34)	(2.46)	(0.35)	(0.32)	(0.35)	(0.36)	(0.31)	(0.35)
D*FSS (β_2)		-1.26**	1.38	-0.54	-0.37	-0.98*	-0.72*	-1.7	-0.68
		(0.37)	(2.46)	(0.45)	(0.38)	(0.44)	(0.31)	(2.70)	(0.44)
$\beta_1 + \beta_2$		-1.04**	-0.28	-0.63	-0.66	-1.06*	-0.80*	-1.97	-0.71
		(0.35)	(0.31)	(0.44)	(0.48)	(0.42)	(0.31)	(2.71)	(0.43)
R^2	0.03	0.05	0.03	0.03	0.03	0.04	0.04	0.03	0.03
N	1,451	1,451	1,451	1,451	1,451	1,451	1,451	1,451	1,451

Panel C. Debt-service ratio

Constant	3.90**	4.13**	3.98**	4.30***	4.04**	3.96**	4.01**	3.97**	4.23***
	(1.11)	(1.15)	(1.18)	(1.11)	(1.16)	(1.15)	(1.15)	(1.16)	(1.06)
AR coefficient	0.77***	0.76***	0.77***	0.75***	0.77***	0.77***	0.77***	0.77***	0.76***
	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	(0.07)
FSS (β_1)	-0.17	-0.05	-0.38	-0.03	-0.15	-0.15	-0.11	-0.18	-0.05
	(0.14)	(0.14)	(0.24)	(0.14)	(0.13)	(0.16)	(0.14)	(0.15)	(0.13)
D*FSS (β_2)		-0.25**	0.21	-0.42	-0.21	-0.09	-0.17*	-0.03	-0.38
		(0.09)	(0.30)	(0.20)	(0.12)	(0.11)	(0.08)	(0.12)	(0.21)
$\beta_1 + \beta_2$		-0.30*	-0.17	-0.44*	-0.36	-0.24	-0.28	-0.21*	-0.43
		(0.14)	(0.15)	(0.20)	(0.21)	(0.13)	(0.15)	(0.08)	(0.22)
R^2	0.54	0.55	0.54	0.55	0.54	0.54	0.54	0.54	0.55
N	1,153	1,136	1,136	1,136	1,136	1,136	1,136	1,136	1,136

Table 7: Governance frameworks and heterogeneous effects of FSS for financial cycle indicators around crises

This table reports the results for the following panel-data regression setting:

$$FS_{i,t+4} = \alpha_i + \alpha + (\beta_1 + \beta_2 D_{i,t-1} + \beta_3 TP_{i,t+4} + \beta_4 D_{i,t-1} TP_{i,t+4}) FSS_{i,t} + \gamma FS_{i,t} + e_{i,t+4},$$

where $FS_{i,t}$ is one of the following financial cycle indicators: the credit-to-GDP gap (panel A), the 4-quarters credit growth (panel B), and the debt service ratio (panel C). $D_{i,t}$ is a dummy that takes the value of 1 when the country's central bank has one of the characteristics in the governance framework database and zero otherwise, $TP_{i,t}$ is a dummy that takes the value of 1 when there is a turning point in credit-to-GDP gap followed by a decrease in the gap over at least the next four quarters, and $FSS_{i,t}$ is the financial stability sentiment index calculated using the text in FSRs. Standard errors are corrected using Huber-White standard deviations (see Wooldridge, 2002), and are reported in parentheses. *,**, and *** represent the usual 10%, 5%, and 1% significance levels.

Panel A. Credit-to-GDP gap

	Homogeneous	Committee	Financial stability mandate	Oversight	Committee and oversight	Committee and no oversight	Committee and mandate	Committee and no mandate	Oversight and mandate
Constant	-0.25	-0.12	-0.18	-0.18	-0.18	-0.14	-0.18	-0.18	-0.15
	(0.55)	(0.45)	(0.50)	(0.51)	(0.49)	(0.46)	(0.50)	(0.51)	(0.49)
AR coefficient	0.87***	0.84***	0.85***	0.85***	0.85***	0.85***	0.85***	0.85***	0.85***
	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)
FSS (β_1)	-0.27	0.08	-0.74	-0.33	-0.49	-0.21	-0.56	-0.3	-0.3
	(0.59)	(0.57)	(1.42)	(0.61)	(0.51)	(0.53)	(0.53)	(0.59)	(0.56)
D*FSS (β_2)		-1.43**	0.18	-0.46	-0.52	-1.00*	-0.3	-0.54	-1.13
		(0.44)	(1.50)	(0.46)	(0.34)	(0.42)	(1.61)	(0.46)	(0.62)
TP*FSS (β_3)		3.94*	0.57**	1.90***	3.11**	3.86*	3.07**	1.88***	3.77*
		(1.69)	(0.19)	(0.32)	(1.10)	(1.61)	(1.06)	(0.32)	(1.52)
D*TP*FSS (β_4)		-2.56	2.48*	3.33	-2.59	-2.45	-3.10**	3.49	-2.26
		(1.67)	(0.97)	(2.97)	(1.45)	(1.59)	(0.97)	(3.07)	(1.51)
$\beta_1 + \beta_3$		4.02	-0.18	1.57*	2.62	3.65	2.51	1.58*	3.47
		(1.99)	(1.32)	(0.67)	(1.39)	(1.87)	(1.36)	(0.66)	(1.79)
$\beta_2 + \beta_4$		-3.99*	2.66	2.87	-3.1	-3.45*	-3.4	2.96	-3.39*
		(1.80)	(1.76)	(2.77)	(1.68)	(1.69)	(1.82)	(2.89)	(1.61)
R^2	0.69	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
N	1,544	1,522	1,522	1,522	1,522	1,522	1,522	1,522	1,522

Table 7: Governance frameworks and heterogeneous effects of FSS for financial cycle indicators around crises, continued

Panel B. Credit growth

	Homogeneous	Committee	Financial stability mandate	Oversight	Committee and oversight	Committee and no oversight	Committee and mandate	Committee and no mandate	Oversight and mandate
Constant	1.87***	2.08***	1.96***	2.00***	1.97***	2.01***	2.02***	1.96***	2.01***
	(0.31)	(0.26)	(0.29)	(0.29)	(0.29)	(0.27)	(0.26)	(0.29)	(0.29)
AR coefficient	0.17*	0.13	0.16	0.15	0.16	0.15	0.15	0.16	0.15
	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)
FSS (β_1)	-0.34	-0.06	-1.72	-0.3	-0.5	-0.33	-0.33	-0.49	-0.24
	(0.33)	(0.31)	(2.47)	(0.33)	(0.30)	(0.32)	(0.32)	(0.29)	(0.33)
D*FSS (β_2)		-1.10**	1.23	-0.51	-0.3	-0.86*	-0.62*	-1.46	-0.65
		(0.34)	(2.47)	(0.42)	(0.37)	(0.41)	(0.29)	(2.71)	(0.41)
TP*FSS (β_3)		2.23**	0.68***	1.29***	1.78***	2.30***	2.20**	1.87***	1.27***
		(0.69)	(0.14)	(0.27)	(0.44)	(0.62)	(0.64)	(0.44)	(0.26)
D*TP*FSS (β_4)		-1.23	1.14*	1.46	-0.2	-1.43*	-1.14	-2.15***	1.52
		(0.72)	(0.43)	(1.11)	(1.08)	(0.64)	(0.67)	(0.44)	(1.15)
$\beta_1 + \beta_3$		2.17**	-1.04	0.99*	1.28*	1.97**	1.87*	1.38*	1.03*
		(0.77)	(2.54)	(0.43)	(0.56)	(0.70)	(0.74)	(0.54)	(0.43)
$\beta_2 + \beta_4$		-2.33**	2.36	0.96	-0.5	-2.30**	-1.76*	-3.61	0.87
		(0.81)	(2.54)	(1.20)	(1.02)	(0.79)	(0.71)	(2.75)	(1.23)
R^2	0.03	0.08	0.06	0.06	0.06	0.07	0.06	0.06	0.06
N	1,451	1,451	1,451	1,451	1,451	1,451	1,451	1,451	1,451

Table 7: Governance frameworks and heterogeneous effects of FSS for financial cycle indicators around crises, continued

Panel C. Debt-service ratio

	Homogeneous	Committee	Financial stability mandate	Oversight	Committee and oversight	Committee and no oversight	Committee and mandate	Committee and no mandate	Oversight and mandate
Constant	3.90**	4.20**	4.06**	4.35***	4.11**	4.09**	4.05**	4.28***	4.05**
	(1.11)	(1.15)	(1.17)	(1.10)	(1.14)	(1.14)	(1.15)	(1.07)	(1.14)
AR coefficient	0.77***	0.76***	0.77***	0.75***	0.76***	0.77***	0.77***	0.75***	0.77***
	(0.08)	(0.08)	(0.08)	(0.07)	(0.08)	(0.08)	(0.08)	(0.07)	(0.08)
FSS (β_1)	-0.17	-0.09	-0.42	-0.06	-0.18	-0.15	-0.21	-0.08	-0.19
	(0.14)	(0.14)	(0.26)	(0.14)	(0.13)	(0.14)	(0.15)	(0.13)	(0.16)
D*FSS (β_2)		-0.23*	0.21	-0.41	-0.2	-0.15	-0.02	-0.38	-0.08
		(0.09)	(0.31)	(0.20)	(0.11)	(0.08)	(0.11)	(0.21)	(0.12)
TP*FSS (β_3)		0.30**	0.2	0.20**	0.26***	0.32***	0.28***	0.20**	0.35***
		(0.09)	(0.11)	(0.07)	(0.07)	(0.09)	(0.07)	(0.07)	(0.08)
D*TP*FSS (β_4)		-0.09	0.08	0.19	0.08	-0.13	-0.13	0.2	-0.20*
		(0.11)	(0.12)	(0.11)	(0.26)	(0.10)	(0.14)	(0.12)	(0.10)
$\beta_1 + \beta_3$		0.21	-0.22	0.14	0.07	0.17	0.06	0.12	0.16
		(0.15)	(0.15)	(0.14)	(0.12)	(0.14)	(0.14)	(0.13)	(0.17)
$\beta_2 + \beta_4$		-0.33**	0.29	-0.22	-0.12	-0.28**	-0.15	-0.18	-0.28**
		(0.10)	(0.23)	(0.21)	(0.32)	(0.10)	(0.20)	(0.22)	(0.10)
R^2	0.54	0.55	0.54	0.55	0.55	0.55	0.54	0.55	0.54
N	1,153	1,136	1,136	1,136	1,136	1,136	1,136	1,136	1,136

Table 8: Governance frameworks and the heterogeneous predictive power of FSS for turning points in the financial cycle

This table reports the results for the following panel-data Probit setting:

$$Pr[TP_{i,t+4} = 1] = \Phi[X_{i,t}\beta],$$

where $TP_{i,t}$ is a dummy that takes the value of 1 when there is a turning point in credit-to-GDP gap followed by a decrease in the gap over at least the next four quarters and $FSS_{i,t}$ is the financial stability sentiment index calculated using the text in FSRs. For each governance framework characteristic, we split the sample into central banks with that characteristics ("Yes") and those without it ("No"). *,**, and *** represent the usual 10%, 5%, and 1% significance levels.

	Committee		Financial stability mandate		Oversight		Committee and oversight		Committee and mandate		Oversight and mandate	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Constant	-1.46***	-1.49***	-1.50***	-1.30***	-1.56***	-1.41***	-1.53***	-1.49***	-1.42***	-1.52***	-1.56***	-1.43***
	(0.07)	(0.06)	(0.05)	(0.07)	(0.07)	(0.05)	(0.12)	(0.05)	(0.08)	(0.06)	(0.08)	(0.05)
FSS	0.06	0.24**	0.16	0.30*	-0.05	0.32***	-0.33	0.25***	0.05	0.24**	-0.06	0.32***
	(0.14)	(0.09)	(0.09)	(0.13)	(0.14)	(0.05)	(0.25)	(0.06)	(0.15)	(0.08)	(0.15)	(0.05)
R^2	0.00	0.02	0.01	0.01	0.00	0.03	0.03	0.02	0.00	0.02	0.00	0.03
N	801	751	1,411	141	861	691	294	1,258	584	968	791	761

Table 9: Governance frameworks and communication strategies

This table reports the results for the following panel-data regression setting:

$$FSS_{i,t+1} = \alpha_i + \alpha + (\beta_1 + \beta_2 D_{i,t-1})X_{i,t} + \gamma FSS_{i,t-3} + e_{i,t+1},$$

where $FSS_{i,t}$ is the financial stability sentiment index calculated using the text in FSRs, $D_{i,t}$ is a dummy that takes the value of 1 when the country's central bank has one of the characteristics in the governance framework database and zero otherwise, $X_{i,t}$ is each one of the financial cycle characteristics. We only report the results for two governance characteristics: whether the central bank participates in an interagency financial stability committee (panel A) and whether the central bank has an oversight role (panel B). Standard errors are corrected using Huber-White standard deviations (see Wooldridge, 2002), and are reported in parentheses. *,**, and *** represent the usual 10%, 5%, and 1% significance levels.

Panel A. Central banks in interagency committees

	CGDP Gap	Log of CGDP	DSR	SRISK to GDP	Bank CDS	Bank volatility	Log of prop. price	Log of hshold credit
Constant	0.22***	0.24***	0.23***	0.21***	0.24***	0.23***	0.26***	0.23***
	(0.04)	(0.04)	(0.04)	(0.05)	(0.05)	(0.03)	(0.04)	(0.04)
AR coefficient	0.87***	-0.93	-0.53	0.65***	0.70***	0.38***	1.01	-0.41
	(0.04)	(1.40)	(0.43)	(0.06)	(0.07)	(0.10)	(0.82)	(1.03)
RHS variable (β_1)	0.01**	0.41	0.10**	0.08***	0.09	0.02***	0.00	0.37
	(0.00)	(0.30)	(0.03)	(0.02)	(0.06)	(0.01)	(0.18)	(0.27)
D*RHS (β_2)	0	-0.06**	-0.02*	-0.01	0.05	0.00	-0.07**	-0.08**
	(0.01)	(0.02)	(0.01)	(0.02)	(0.06)	(0.00)	(0.02)	(0.02)
$\beta_1 + \beta_2$	0.01	0.43	0.08**	0.08***	0.13*	0.02***	-0.31	0.35
	(0.01)	(0.32)	(0.03)	(0.02)	(0.06)	(0.00)	(0.16)	(0.27)
R^2	0.10	0.08	0.15	0.12	0.11	0.18	0.10	0.09
N	1,550	1,553	1,153	1,550	1,138	1,764	1,847	1,544

Panel B. Central banks with an oversight role

Constant	0.85***	0.5	-0.52	0.64***	0.73***	0.35***	1.19	0.4
	(0.04)	(1.40)	(0.46)	(0.07)	(0.08)	(0.09)	(0.87)	(0.95)
AR coefficient	0.21***	0.24***	0.23***	0.21***	0.23***	0.23***	0.26***	0.24***
	(0.04)	(0.04)	(0.04)	(0.05)	(0.05)	(0.03)	(0.04)	(0.04)
RHS variable (β_1)	0.02**	0.13	0.10**	0.08***	0.15	0.02**	-0.01	0.18
	(0.00)	(0.29)	(0.03)	(0.02)	(0.07)	(0.01)	(0.19)	(0.25)
D*RHS (β_2)	-0.01	-0.10***	-0.03***	0.01	-0.07	0.01	-0.11***	-0.12***
	(0.01)	(0.03)	(0.00)	(0.03)	(0.04)	(0.00)	(0.03)	(0.03)
$\beta_1 + \beta_2$	0.01	0.12	0.07*	0.09**	0.07	0.02***	-0.36*	0.11
	(0.00)	(0.32)	(0.03)	(0.03)	(0.04)	(0.00)	(0.17)	(0.25)
R^2	0.10	0.08	0.14	0.12	0.11	0.19	0.09	0.08
N	1,550	1,553	1,153	1,550	1,138	1,764	1,847	1,544

Table 10: Coherence in communication, the effect of FSS on macroprudential tools and monetary policy rates

This table reports the results for the following panel-data regression setting:

$$PA_{i,t+4} = \alpha_i + \alpha + (\beta_1 + \beta_2 D_{i,t-1}) FSS_{i,t} + \gamma_3 PA_{i,t} + e_{i,t+4},$$

where $PA_{i,t}$ is either cumulative macroprudential index from Cerutti et al. (2016) (Panel A) or the monetary policy rate. $D_{i,t-1}$ is a dummy that takes the value of 1 when the country's central bank has one of the characteristics in the governance framework database and zero otherwise and $FSS_{i,t}$ is the financial stability sentiment index calculated using the text in FSRs. The results in panel B (monetary policy) exclude all euro-area countries. Standard errors are corrected using Huber-White standard deviations (see Wooldridge, 2002), and are reported in parentheses. *,**, and *** represent the usual 10%, 5%, and 1% significance levels.

Panel A. Cumulative macro prudential policies

	Homogeneous	Committee	Committee with powers	Financial stability mandate	Oversight	Committee and oversight	Committee and no oversight	Committee and mandate	Committee and no mandate	Oversight and mandate
Constant	0.46***	0.50***	0.48***	0.49***	0.48***	0.48***	0.50***	0.49***	0.48***	0.48***
	(0.10)	(0.10)	(0.10)	(0.10)	(0.10)	(0.10)	(0.10)	(0.10)	(0.10)	(0.10)
AR coefficient	0.93***	0.91***	0.92***	0.92***	0.92***	0.92***	0.90***	0.91***	0.92***	0.92***
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
FSS (β_1)	-0.04	-0.15*	-0.06	-0.36**	-0.02	-0.03	-0.15*	-0.14*	-0.05	-0.03
	(0.06)	(0.06)	(0.06)	(0.12)	(0.08)	(0.06)	(0.07)	(0.06)	(0.07)	(0.08)
D*FSS (β_2)		0.25*	0.61***	0.33*	-0.06	-0.1	0.45***	0.27*	-0.02	-0.03
		(0.10)	(0.08)	(0.13)	(0.11)	(0.19)	(0.12)	(0.10)	(0.30)	(0.12)
$\beta_1 + \beta_2$		0.1	0.54***	-0.03	-0.08	-0.13	0.30**	0.13	-0.07	-0.06
		(0.10)	(0.06)	(0.07)	(0.09)	(0.19)	(0.10)	(0.11)	(0.29)	(0.09)
R^2	0.68	0.68	0.68	0.68	0.68	0.68	0.69	0.68	0.68	0.68
N	1,414	1,387	1,387	1,387	1,387	1,387	1,387	1,387	1,387	1,387

Panel B. Monetary policy rate

Constant	1.78***	1.87***	1.86***	1.83***	1.89***	1.79***	1.79***	1.80***	1.79***	1.83***
	(0.29)	(0.30)	(0.31)	(0.30)	(0.29)	(0.29)	(0.29)	(0.29)	(0.29)	(0.29)
AR coefficient	0.60***	0.58***	0.59***	0.59***	0.58***	0.59***	0.59***	0.59***	0.59***	0.59***
	(0.07)	(0.08)	(0.08)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)
FSS (β_1)	-0.46***	-0.37***	-0.46***	-0.48	-0.40***	-0.45***	-0.42***	-0.43***	-0.44***	-0.41***
	(0.05)	(0.08)	(0.06)	(0.36)	(0.07)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
D*FSS (β_2)		-0.18*	-0.27	0.01	-0.24	-0.06	-0.14*	-0.09	-0.36	-0.19
		(0.09)	(0.24)	(0.36)	(0.14)	(0.10)	(0.07)	(0.05)	(0.37)	(0.14)
$\beta_1 + \beta_2$		-0.55***	-0.72**	-0.47***	-0.64***	-0.51***	-0.56***	-0.51***	-0.80*	-0.60***
		(0.06)	(0.25)	(0.05)	(0.11)	(0.10)	(0.07)	(0.05)	(0.35)	(0.12)
R^2	0.42	0.41	0.41	0.41	0.41	0.41	0.42	0.42	0.42	0.42
N	1,673	1,622	1,622	1,622	1,622	1,656	1,656	1,656	1,656	1,656

Table 11: Coherence in communication around crises

This table reports the results for the following panel-data regression setting:

$$PA_{i,t+4} = \alpha_i + \alpha + (\beta_1 + \beta_2 D_{i,t-1} + \beta_3 TP_{i,t+4} + \beta_4 D_{i,t-1} TP_{i,t+4}) FSS_{i,t} + \gamma_3 PA_{i,t} + e_{i,t+4},$$

where $Y_{i,t}$ is either cumulative macroprudential index from Cerutti et al. (2016) (Panel A) or the monetary policy rate. $D_{i,t-1}$ is a dummy that takes the value of 1 when the country's central bank has one of the characteristics in the governance framework database and zero otherwise, , $TP_{i,t}$ is a dummy that takes the value of 1 when there is a turning point in credit-to-GDP gap followed by a decrease in the gap over at least the next four quarters, and $FSS_{i,t}$ is the financial stability sentiment index calculated using the text in FSRs. Standard errors are corrected using Huber-White standard deviations (see Wooldridge, 2002), and are reported in parentheses. *,**, and *** represent the usual 10%, 5%, and 1% significance levels.

Panel A. Cumulative macro prudential policies

	Homogeneous	Committee	Committee with powers	Financial stability mandate	Oversight	Committee and oversight	Committee and no oversight	Committee and mandate	Committee and no mandate	Oversight and mandate
Constant	0.46***	0.51***	0.47***	0.48***	0.48***	0.47***	0.50***	0.51***	0.47***	0.48***
	(0.10)	(0.11)	(0.11)	(0.11)	(0.11)	(0.11)	(0.11)	(0.11)	(0.11)	(0.11)
AR coefficient	0.93***	0.96***	0.97***	0.98***	0.98***	0.98***	0.96***	0.96***	0.98***	0.98***
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
FSS (β_1)	-0.04	-0.11	-0.01	-0.57***	0.03	0.01	-0.1	-0.11	0.01	0.01
	(0.06)	(0.07)	(0.07)	(0.12)	(0.10)	(0.07)	(0.08)	(0.07)	(0.07)	(0.10)
D*FSS (β_2)		0.26*	0.65***	0.61***	-0.05	-0.05	0.39**	0.29**	-0.21	0
		(0.10)	(0.10)	(0.14)	(0.13)	(0.20)	(0.12)	(0.11)	(0.40)	(0.13)
TP*FSS (β_3)		-0.06	-0.03	0.79	-0.05	-0.06	-0.04	-0.01	-0.08	0
		(0.07)	(0.08)	(0.74)	(0.09)	(0.07)	(0.08)	(0.08)	(0.07)	(0.10)
D*TP*FSS (β_4)		0.05	-3.65***	-0.87	0	0.16	-0.03	-0.08	0.88	-0.16
		(0.18)	(0.26)	(0.74)	(0.18)	(0.82)	(0.13)	(0.15)	(1.01)	(0.16)
$\beta_1 + \beta_3$		-0.16*	-0.04	0.21	-0.02	-0.04	-0.15	-0.12	-0.07	0
		(0.07)	(0.08)	(0.63)	(0.10)	(0.08)	(0.08)	(0.07)	(0.08)	(0.11)
$\beta_2 + \beta_4$		0.31	-3.00***	-0.26	-0.05	0.11	0.37*	0.21	0.67	-0.16
		(0.15)	(0.19)	(0.63)	(0.17)	(0.77)	(0.14)	(0.14)	(0.63)	(0.16)
R^2	0.68	0.71	0.71	0.71	0.70	0.70	0.71	0.71	0.71	0.70
N	1,414	1,080	1,080	1,080	1,080	1,080	1,080	1,080	1,080	1,080

Table 11: Coherence in communication around crises, continued

Panel B. Monetary policy rate

	Homogeneous	Committee	Committee with powers	Financial stability mandate	Oversight	Committee and oversight	Committee and no oversight	Committee and mandate	Committee and no mandate	Oversight and mandate
Constant	1.78***	1.92***	1.93***	1.88***	1.95***	1.88***	1.90***	1.90***	1.89***	1.95***
	(0.29)	(0.29)	(0.30)	(0.28)	(0.27)	(0.28)	(0.29)	(0.29)	(0.29)	(0.27)
AR coefficient	0.60***	0.55***	0.55***	0.56***	0.55***	0.56***	0.56***	0.56***	0.56***	0.55***
	(0.07)	(0.08)	(0.08)	(0.08)	(0.07)	(0.08)	(0.08)	(0.08)	(0.08)	(0.07)
FSS (β_1)	-0.46***	-0.39***	-0.47***	-0.86**	-0.41***	-0.48***	-0.44***	-0.45***	-0.48***	-0.41***
	(0.05)	(0.08)	(0.06)	(0.27)	(0.07)	(0.06)	(0.06)	(0.07)	(0.06)	(0.07)
D*FSS (β_2)		-0.16	-0.31	0.4	-0.24	0	-0.12	-0.08	-0.19	-0.25
		(0.08)	(0.25)	(0.28)	(0.15)	(0.08)	(0.07)	(0.06)	(0.35)	(0.16)
TP*FSS (β_3)		-0.06	0.05	0.54	-0.08	-0.01	0.09	0.02	0.04	-0.06
		(0.11)	(0.08)	(0.40)	(0.06)	(0.07)	(0.14)	(0.12)	(0.08)	(0.06)
D*TP*FSS (β_4)		0.24	1.50**	-0.49	0.74*	0.97*	-0.05	0.11	0.62	0.66*
		(0.16)	(0.46)	(0.40)	(0.28)	(0.45)	(0.16)	(0.16)	(0.46)	(0.29)
$\beta_1 + \beta_3$		-0.45***	-0.42***	-0.32	-0.49***	-0.49***	-0.35**	-0.43***	-0.43***	-0.47***
		(0.10)	(0.09)	(0.39)	(0.09)	(0.07)	(0.13)	(0.11)	(0.08)	(0.09)
$\beta_2 + \beta_4$		0.08	1.19***	-0.09	0.49	0.97	-0.17	0.03	0.44	0.42
		(0.15)	(0.23)	(0.39)	(0.30)	(0.48)	(0.17)	(0.15)	(0.49)	(0.31)
R^2	0.42	0.39	0.39	0.39	0.40	0.39	0.39	0.39	0.39	0.39
N	1,673	1,160	1,160	1,160	1,160	1,160	1,160	1,160	1,160	1,160

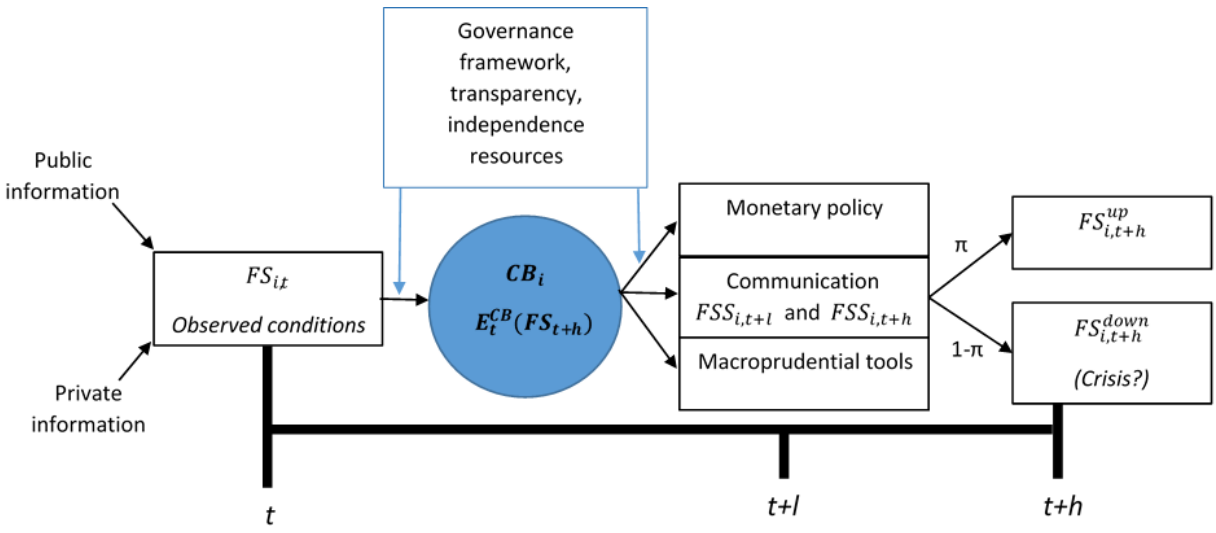
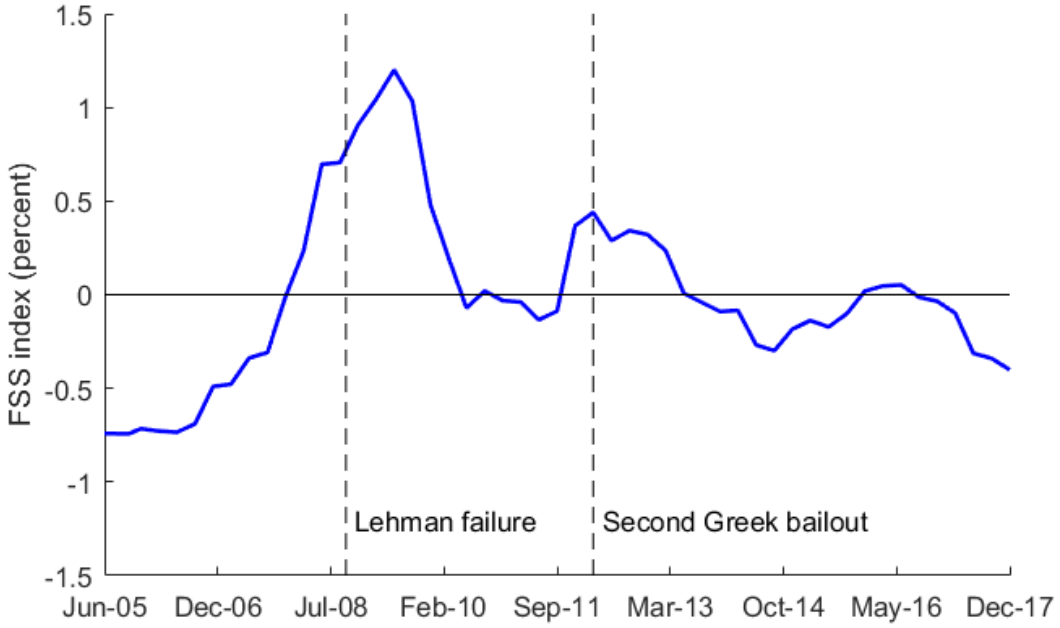
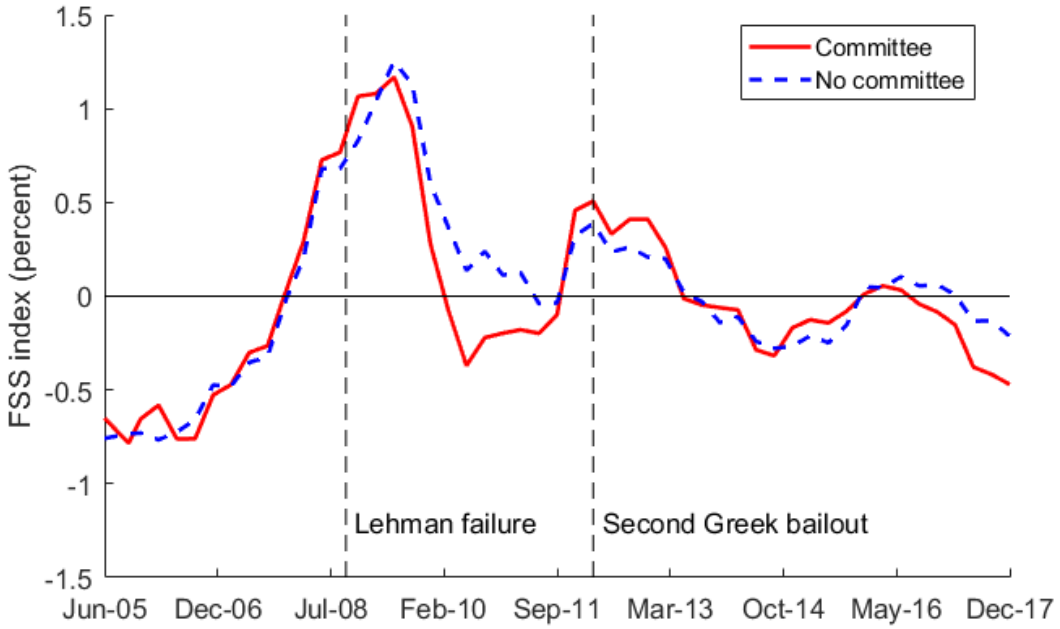


Figure 1: Central bank communication and financial stability governance

This figure shows a diagram for the conceptual framework used to understand the interaction between governance frameworks and central bank communication.

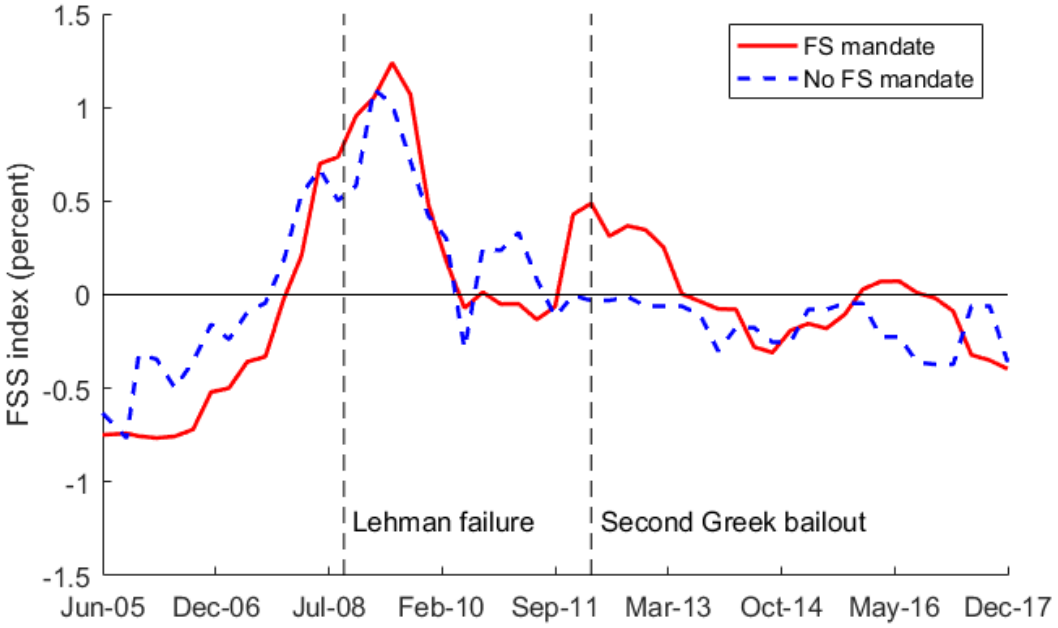


(a) A. All Countries

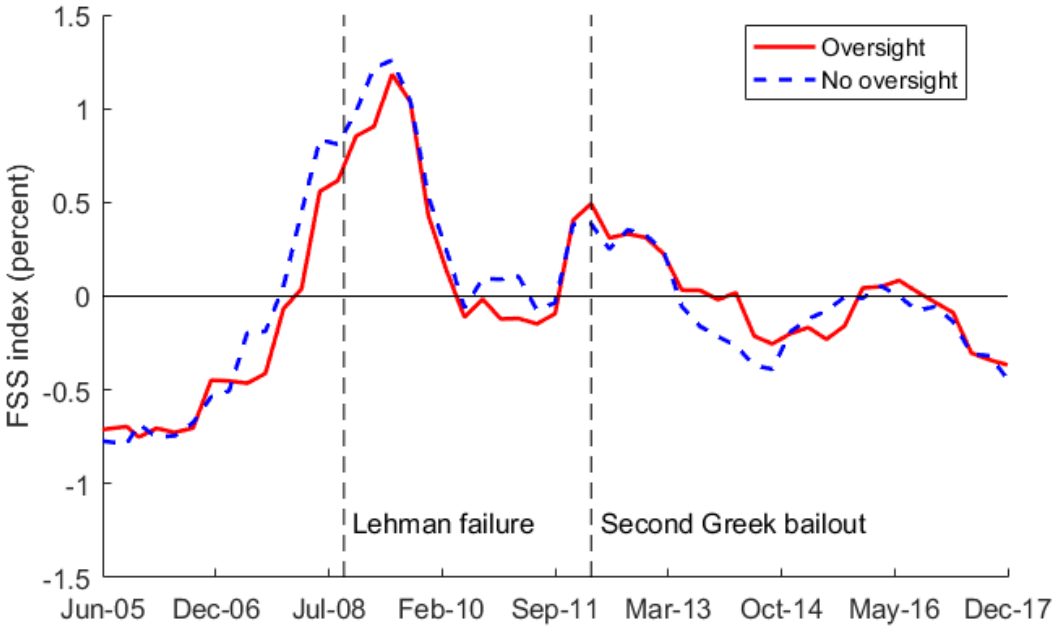


(b) B. Interagency financial stability committee

Figure 2: FSS indexes, averages across countries depending on governance frameworks
Panel A of this figure shows the equally-weighted average of all countries' demeaned FSS indexes. Panel B shows the average across all countries for which the central bank participates (red solid line) or not (dashed blue line) in an interagency financial stability committee. Panel C shows the average across all countries for which the central bank has (red solid line) or not (dashed blue line) a financial stability mandate. Panel D shows the average across all countries for which the central bank has (red solid line) or not (dashed blue line) an oversight role for financial institutions. For reference, we add vertical lines for the following key dates (quarterly equivalent): the collapse of Lehman Brothers (marked as October of 2008) and the second Greek bailout (marked as March of 2012).



(a) C. Financial stability mandate



(b) D. Oversight role

Figure 2: FSS indexes, averages across countries depending on governance frameworks, continued