Financial Stability Governance and Central Bank Communications*

Preliminary version. Please do not quote

Juan M. Londono[†1], Stijn Claessens[2], and Ricardo Correa[1]

[1]Federal Reserve Board
[2]Bank for International Settlements

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Abstract

We investigate how central banks' governance frameworks influence their financial stability communication strategies and strategies' effectiveness in preventing a worsening of financial cycle characteristics. We propose a simple conceptual framework of how central banks' communicate on financial stability and how this shapes the evolution of the financial cycle. We test our framework using data on the governance characteristics of 24 central banks and the sentiment conveyed in their financial stability reports. We find robust evidence that communications by central banks participating in interagency financial stability committees more effectively halt a deterioration of financial conditions and prevent potential financial stability events. After observing a deterioration, such central banks also transmit a calmer message, given observed financial conditions and general news sentiment, suggesting that being able to implement policy tools other than communications strengthens incentives not to just "cry wolf".

JEL Classification: G15, G28.
Keywords: Financial Stability Governance, Natural Language Processing, Central Bank Communications, Financial Cycle.

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[†]Corresponding author. E-mail: juan.m.londono@frb.gov

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1. Introduction

After the global financial crisis of 2008-09, many countries took steps to enhance the resilience of their financial system and prevent the build-up of vulnerabilities. They strengthened their macroprudential regulatory frameworks and many central banks obtained a more explicit financial stability mandate and incorporated financial stability objectives in their decision making process (Jeanneau, 2014). With these changes, financial stability monitoring has become an even more important task for central banks and communications about financial stability have also become a tool to influence financial agents' behavior (see, for instance, Born et al., 2014). 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.[1] Yet the drivers and the effects of financial stability communications, including its interactions with financial stability governance and oversight frameworks, have largely remain unexplored in the literature.

In this paper, we study how variations in financial stability 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 help understand how governance frameworks might interact with central banks' communication strategies, we first propose a simple conceptual framework. We start from the assumption that 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. The central bank therefore 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 bank's characteristics, including its role in the country's macroprudential governance, as well as its independence, transparency, and resources, the central bank then

[1] Arseneau (2020) explores how central bank communications related to financial stability may be associated with the financial cycle from a theoretical perspective.

decides both its communication strategy and whether or not to adjust its policy instruments, such as macroprudential measures or the monetary policy rate. 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 or turning point in the financial cycle.

Next, we create a database detailing the governance and oversight frameworks of 24 countries' central banks.[2] 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 the authority to use macroprudential or other related financial stability 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 then use text analysis techniques to determine the sentiment conveyed by communications used by central banks to transmit 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) index constructed based on this reports by Correa et al. 2017c (CGLM hereafter).

we use a panel-data regression setting to assess how cross-country differences in governance and oversight frameworks affect communication strategies. We exploit this cross-country heterogeneity to investigate how the FSS conveyed by central banks' communications affects the evolution of financial cycle characteristics, our proxies for financial vulnerabilities, depending on four governance and oversight characteristics: (i) whether the central bank participates in an interagency financial stability committee; (ii) whether the committee has the power to implement policy tools, including macroprudential tools; (iii) whether the central bank has been given a financial stability mandate; and (iv) whether the central bank has oversight powers for banks domiciled in the country. We find that central banks partici-

[2]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.

pating in interagency financial stability committees are relatively more effective in limiting a deterioration of financial cycle characteristics than others. We also explore whether the effect of central banks' communications varies around turning points in the financial cycle. We find that central banks participating in these committees are more effective in alleviating a deterioration of financial cycle conditions right before crises.

We also find that for central banks with none of the four governance characteristics, 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 0.21 to 0.26 percent higher probability of a turning point. In other words, those central banks with little power often"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 that turning points are not observed for those central banks that are very effective (or perhaps just lucky) at preventing turning points, a limitation of our identification strategy. However, communications by central banks participating in a committee with the ability to implement macroprudential tools are effective at reducing the probability of a turning point in the financial cycle. This result provides evidence of the relation between communication strategies, the implementation of macroprudential policies, and a more favorable evolution of the financial cycle.

We then investigate the drivers of the relative effectiveness of communications 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 transmit a calmer message than banks without these characteristics. We also show that some central banks strategically deviate from the information that is publicly available when communicating through financial stability reports by exploring the dynamic relation between the sentiment in financial stability reports and that in the news. For this exercise, we calculate a novel index of financial stability using the text in news articles related to financial stability,

which we name NS. Although NS and FSS are highly correlated, after a deterioration of the sentiment in news articles, central banks participating in financial stability committees transmit a calmer message. This again shows that strategies differ based on the governance framework of the country.

Transmitting a calmer message might be the result of the central bank having at its disposal other instruments and acting accordingly. To explore this, we assess whether the FSS index is associated with either the evolution of actions related to macroprudential policies (Cerutti, Correa, Fiorentino, and Segalla, 2016), or with the monetary policy rate. We would expect the communication of a central bank that can influence, directly or indirectly, macroprudential actions to be positively correlated with such actions. Consistent with this, we find that a deterioration in sentiment conveyed by central banks participating in inter-agency financial stability committees with authority for macroprudential or related policy instruments is followed by an adjustment of these instruments. However, this effects holds only outside of crises. Before crises, a deterioration is followed by relatively looser macroprudential policies, possibly an attempt to stave off the consequences of the forthcoming crisis.

The findings on interest rates are less obvious, in that a deterioration in sentiment is followed by lower interest rates, irrespective of governance characteristics. However, when we take turning points in the financial cycle into account, we find that 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 an effort by the central bank to curtail vulnerabilities in the financial system just prior to a turning point. Monetary policy may play such a role if all the other measures used are found to be ineffective (Stein, 2019). We also find that even after controlling for policy actions, the sentiment in FSRs is useful at preventing the deterioration of financial conditions for central banks with certain governance characteristics, which suggests that words matter beyond actions.

This paper combines two strands in the literature focusing on financial stability governance frameworks and on central bank communications. The literature on central banks' financial stability governance frameworks and related use of macroprudential policies has gained much 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 their interactions with central banks' 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 recent studies have explored 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' communications on financial cycle characteristics. Osterloo et al. (2011) explore the effect of the publication of FSRs on a number 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 proxy the sentiment conveyed by central banks' financial stability communications and to investigate the effect of sentiment on financial cycle characteristics.[3] CGLM use their financial stability dictionary to calculate an 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 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

[3]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.

that central banks 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.[4]

Adding to this literature, our paper makes a contributions by evaluating the interaction between financial stability governance frameworks and central banks' communication strategies. Our work can help to explain why central banks without a direct prudential oversight role might rely more on communication to transmit concerns about financial stability, as they may need to signal to other agencies with a supervisory purview to act when financial vulnerabilities increase. It also suggests that 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

[4]An increasing number of studies use textual information to complement other 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.

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 communicating about financial stability, the central bank might in this period also use other policy tools, including 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 the period $t + h$, a good state, which occurs with probability π, and a bad state, financial crisis or turning point in the cycle, which occurs with probability $1 - \pi$. The goal of the central bank is to decide the mixture of tools, including financial stability communication, that best minimizes the probability of the bad state. We now provide more details about the model.

In the first period, t, the central bank of country i observes a set of financial cycle characteristics, $FS_{i,t}$, which includes not only the information 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 $t + h$ (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, of 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}.

The central bank's 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 being full transparent (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 may have 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 other tools it has at its disposal and the confidence it has in them: for example, the central bank believes it has the tools to prevent a financial crisis (or financial boom) and is willing to use the tools, 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.

The 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 (FSS) and policy actions (PA), and the subsequent shocks to financial stability,

$z_{i,t+h}$:

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

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, including actual financial crises, will differ by a number of central bank characteristics, including its governance framework. In the following sections, 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 financial stability governance frameworks. In the first part of the section, we introduce the data. Then, we identify the features of 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 quarterly data for 24 countries for the sample period running from 2005 to 2019. Our dataset consists of three types of data: (i) an index of sentiment from financial stability reports, (ii) a set of characteristics related to central banks' governance frameworks, and (iii) a set of financial cycle characteristics.

Financial stability sentiment. 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.[5] 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 2008 GFC.

Panel A of figure 2 shows the time series for the cross-country average of the demeaned FSS indexes. The average FSS increases (that is, sentiment deteriorated) in several key episodes, such as the failure of Lehman Brothers in September of 2008, the approval of the second EU-IMF bailout for Greece in the first quarter of 2012, and the Brexit referendum in the summer of 2016.

Governance frameworks. 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, Edge, and Liang (2017a). These characteristics are: (i) whether the central bank participates in an interagency financial stability committee; (ii) whether the committee has the power to implement policy tools, including macroprudential tools; (iii) whether the central bank has been given a financial stability mandate; and (iv) 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.

Panels B to D of figure 2 show the time series of cross-country averages FSS indexes for

[5]The dictionary created by Correa, Garud, Londono, and Mislang (2017b) can be found in Juan M. Londono's website: https://juanmlondono.wordpress.com/.

central banks with and without each of the governance characteristics in table 1. These panels provide some intuition for the difference in communication strategies and the effectiveness of communication across central banks depending on their governance frameworks. Although cross-country aggregates of the FSS indexes are highly correlated for countries with and without particular governance characteristics, there are interesting differences, including the fact 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.

Financial conditions. 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. Because these credit growth measures are slow-moving variables (compared to asset prices), to explore communication strategies in section 4, we also consider other variables characterizing asset valuations and systemic risk which display more time variation.

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). As can be seen in table 3, although, by construction, the average gap approaches zero for longer samples, there is substantial heterogeneity in the mean gap for the countries in our sample. The mean gap ranges from -9.90 (the United Kingdom) to 20.19 (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 4.0 (Austria) to 14.8 (Hong Kong). The lowest credit gap is observed for Spain (-53.5), while the maximum one is observed for Hong Kong (49.8).

We construct 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 (60 quarters in total), there are no credit-to-GDP gap turning points in Germany. In contrast, there are 9 turning points in Hong Kong and Singapore, the highest numbers in our sample.

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 -1.24 (Argentina) to 9.69 (Turkey) percent, and credit growth volatility ranges from 1.76 (Austria) to 11.81 (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 3.79 (Indonesia) to 27.27 (Netherlands) 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 4.92 (Turkey) percent.

3.2. FSS and the evolution of the financial cycle

We now investigate the extent to which 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 charac-

teristics 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 endogeneity between FSS_t and D_t (although, as noted, the time variation is small for some characteristics).[6] 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.[7]

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 governance characteristics (homogeneous effects). The other regression results suggest, 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. Moreover, the estimated coefficient for the effect of FSS for central banks with a committee, $\beta_1 + \beta_2$, becomes negative and significant. 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. These results for the difference between central banks in an interagency financial committee remain robust to considering only central banks in an official committee, although, in this case, the estimates of β_2 and

[6] Correa, Garud, Londono, and Mislang (2017c) discuss in depth the endogeneity between FSS and financial cycle characteristics. They use a panel VAR setting to control for the documented endogeneity. However, a panel VAR is more restrictive to investigate the interaction between communication and governance frameworks.

[7] In section 4.3, we control for policy actions in the regression setting in equation (5).

$\beta_1 + \beta_2$ are not significant at any standard confidence level.

When we explore the effect of having multiple characteristics, we find that participating in a committee is the main driver of the heterogeneous effects of FSS for the credit-to-GDP gap. In particular, the estimate of β_2 remains negative, although insignificant, only for central banks in a committee and with any other governance characteristic. 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 in an interagency financial stability committee or with an oversight role has a significant and negative effect for the four-quarters-ahead debt-service ratio.[8]

Table 7 explores whether other country-specific characteristics not related to financial stability governance can explain the different effects of financial stability communication on

[8]In the internet appendix (table A.1), we show that the differential effect of participating in a financial stability committee is robust to considering alternative FSS indexes. In particular, to a negativity index, which is calculated as the proportion of negative to total words in FSRs, and to a summary index, which is calculated using only the text in the summaries of FSRs.

financial cycle variables. In particular, we explore the additional effect of the following set of institutional, banking, and linguistic characteristics after considering the effect of participating in a financial stability committee: the transparency index in Dincer and Eichengreen (2014), the central bank independence index in Garriga (2016), the financial openness index in Chinn and Ito (2006), the foreign bank ownership index in Claessens and van Horen (2014), the ratio of total international banking claims from the BIS, and a dummy that takes the value of one when English is one of the native languages of the country and zero otherwise. The results suggest that the differential effect (β_2) of participating in a committee remains negative and significant after controlling for all other variables. The additional effect (β_3) of all additional variables is statistically insignificant at any standard confidence level, which suggests that the differential effects of communication by central banks participating in a financial stability committee reported in table 6 cannot be explained by any of these country-specific characteristics.

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 in the left-hand-side variable of equation 6.

Panel A of table 8 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 results imply that financial stability sentiment for central banks without any of the characteristics becomes a better predictor of the evolution of the credit-to-GDP gap before a turning point. Moreover, a deterioration in sentiment is followed by a deterioration in credit-to-GDP gap around crises for central banks outside of financial stability committees; that is, the estimate of $\beta_1 + \beta_3$ is positive and significant. In other words, central banks outside of committees 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; that is, central banks in interagency financial stability committees are relatively more effective at alleviating the deterioration of the credit-to-GDP gap—β_2 is negative and statistically significant. Interestingly, the coefficient associated with the interaction between FSS, TP, and D becomes positive and significant for central banks participating in committees with powers or 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. However, the result for banks with a financial stability mandate should be taken with caution, as all countries in our sample but Poland received at some point in our sample a financial stability mandate.

The evidence in panels B and C of table 8 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 (except for the debt-service ratio for banks with a financial stability mandate). 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, irrespective of whether their financial cycle nears a turning point or not.

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 demeaned FSS index. 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 9 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 significantly (except for banks with a financial stability mandate) higher probability of a turning point in the financial cycle. This evidence is consistent with that in table 8; 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 only statistically significant for central banks participating in a financial stability committee with powers. The results for central banks without these characteristics could be due to the identification problem mentioned earlier when turning points are never or rarely observed. The evidence in table 9 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.

In the internet appendix, we find that main results in our probit setting are robust along several dimensions. First, our results are robust to considering the alternative negativity and

summary FSS indexes (table A.2). Second, our results for the predictive power for turning points of sentiment conveyed by central banks without any of the governance characteristics are robust to considering the credit-to-GDP gap and debt service ratio as control variables (table A.3). However, when adding these control variables, sentiment in reports published by central banks participating in committees or with a financial stability mandate becomes a positive predictor. The latter results could be affected by multicolinearity due to the correlation between these control variables and FSS.

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 and their effectiveness. 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 communication strategies through the relation between policy actions and sentiment in financial stability reports. In the final part of the section, we explore intentional central banks' communication strategies by studying the deviations between the sentiment in financial stability reports and that in news articles.

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 others 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 10 reports the results of the regression setting in equation (8) for central banks participating in interagency financial stability committees, the governance characteristic that significantly drives the heterogeneous effects of FSS for the evolution of the financial cycle (see section 3). The positive and often significant nature of the estimate of β_1 suggests that financial stability sentiment of central banks not participating in a committee incorporate (near) contemporaneous information from the credit-to-GDP gap, credit growth, debt-service ratio, SRISK-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 deteriorates less following an increase in some financial indicators. That is, the estimate of coefficient β_2 is negative and often statistically significant—β_2 is statistically significant for the credit-to-GDP gap, the logarithm of the credit-to-GDP ratio, the debt-service ratio, and house valuation ratios. Table A.4 in the online appendix shows that communication strategies do not change significantly around crises.

Overall, our evidence suggests that central banks with a committee 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. 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 or alarming markets 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. We explore the first two considerations in the remainder of the section.

4.2. Sentiment in FSRs versus sentiment in news articles

We now explore further central banks' communication strategies by studying the deviation between the sentiment in FSRs and the sentiment collected in news articles related to financial stability. To do so, for each country, we calculate time series of a financial stability sentiment index calculated using news articles related to financial stability, instead of financial stability reports. Similar to the FSS index, for each quarter, the news index, which we call NS, is calculated as the proportion of negative to positive words (as in equation (4)) using all news articles in the Thomson Reuters news database related to financial stability published in that quarter. To select articles related to financial stability, we filter all articles in which the body of the article contains at least one of the top bigrams that are found in all financial stability reports in our sample. To link these articles to each country, we make sure the headline and the body of the article each contain a country-name stem (for instance "Argentin" for Argentina).

Figure 3 compares the (demeaned) time series of FSS, the sentiment index using FSRs, and NS, our novel index of sentiment from news articles related to financial stability.[9] Panel A compares the time series for all countries, while Panels B, C, and D do the same for central banks in a financial stability committee, with a financial stability mandate, and with an oversight role, respectively. Irrespective of the governance characteristic, NS and FSS follow similar dynamics and tend to increase (i.e., a deterioration in sentiment) around episodes of heightened uncertainty. As can be seen from the figures, however, NS tends to increase less than FSS in these key episodes.

To formally compare the dynamics of FSS and NS, table 11 shows the results of a lead-lag analysis between the two sentiment indexes. Panel A shows how the information from NS

[9]The time series of NS can be found in Juan M. Londono's website: https://juanmlondono.wordpress.com/.

is reflected in the one-month-ahead FSS index. The results in this panel confirm the high dynamic correlation between NS and FSS—the coefficient associated with FSS is positive and statistically significant, irrespective of the governance characteristic considered, except for central banks that do not have a financial stability mandate (only one central bank by the end of our sample). Importantly, however, this correlation is lower for central banks participating in interagency financial stability committees; i.e., the estimate of β_2 is negative and significant. The high correlation between FSS and NS and the relatively lower correlation for central banks participating in an interagency financial stability committee are confirmed in Panels B and C, which show, respectively, the contemporaneous relation between FSS and NS indexes and how the information from FSS is reflected in the one-month-ahead NS index. Interestingly, in panel C, β_2 is only statistically significant for the committee dummy and becomes positive and statistically significant for central banks with an oversight role.

Overall, our results suggests that the sentiment in financial stability reports is highly correlated with the sentiment collected in news articles related to financial stability. This high correlation provides preliminary evidence of the credibility of central banks' communication. However, in line with our results so far, sentiment in FSRs published by central banks in interagency financial stability committees tends to deteriorate less coinciding or following a deterioration in the sentiment reflected in news articles, which would provide support to the strategic use of communication by central banks.

4.3. Words versus actions

To explore some of the strategic considerations in financial stability communication, we show in table 12 the results for 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, Correa, Fiorentino, and Segalla (2016) (panel A) or the monetary policy rate (panel B) implemented by the coun-

try's central bank. In table 13, we explore whether the relation between the FSS and policy actions varies around crises by estimating the following regression:

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

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 12 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. In contrast, 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, $\beta_1 + \beta_2$, is only significant for central banks participating in an interagency financial stability committee with powers or for central banks in a committee but no oversight role.

The results in panel A of table 13 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 or without a financial stability mandate, central banks in committees or with a mandate communicate relatively more coherently when implementing macroprudential tools only outside of crises; however, central banks in which committees actually have the ability to implement macroprudential tools tend to implement relatively fewer macroprudential policies around crises.

The results in panel B of table 12 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. 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 balance financial stability concerns and monetary policy objectives using different tools.

The results in panel B of table 13 suggest that the evidence for monetary policy rates varies around crises. In particular, a deterioration in the sentiment in financial stability reports published by central banks in committees with powers is followed by a relative increase in monetary policy rates around crises. In fact, the total effect of FSS for banks in a financial stability committee with powers during crises, $\beta_1 + \beta_2 + \beta_3 + \beta_4$, becomes positive and significant.

We now explore whether, given that communication is more "coherent" for central banks with some of the financial stability governance characteristics, communication complements policy actions at preventing the deterioration of financial cycle conditions. To do so, we estimate the following augmented version of the panel-data regression setting in equation 5:

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

where we control for lagged policy actions; $MP_{i,t}$ is the cumulative macroprudential index from and $IR_{i,t}$ the monetary policy rate. The results are reported in table 14 and suggest

that, after controlling for policy actions, sentiment in FSRs published by central banks in financial stability committees is more effective at alleviating the deterioration of the credit-to-GDP gap and credit growth.

In table 15, we propose an even stronger test by controlling for current policy actions in the following setting:

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

The results reported in table 14 remain robust to considering contemporaneous policy actions, except for those for the debt-service ratio, which suggests that words (that is, the sentiment in FSRs) matter beyond actions.

Finally, table 16 reports the result for the probit setting in equation 7 where we assess the predictive power of FSS for turning points in the financial cycle after controlling for policy actions. The results suggest that the predictive power of FSS remains robust after controlling for policy actions. Specifically, sentiment in FSRs published by central banks without any of the governance characteristics is a better predictor of turning points; in other words, sentiment deteriorates (these central banks "cry wolf"), implement less policy actions than central banks with financial stability governance characteristics (less "coherent" communication), and cannot prevent the occurrence of the crisis.

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 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 concep-

tual framework to understand how central banks incorporate public and private information and decide their communication strategy. This strategy, in turn, 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 are important determinants of the effectiveness of financial stability communication strategies. We use the text in financial stability reports published by the central banks in these countries to derive the sentiment in financial stability communications. We find that communications by central banks participating in an interagency financial stability committee are 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 or the sentiment reflected in news articles, central banks in financial stability committees transmit a calmer message than banks without these characteristics. To understand why banks might decide to transmit a calmer message, we explore the relation between communication and other policy actions, and we find that governance characteristics affect the coherence in financial stability communications; that is, changes in the implementation of policy actions following a deterioration in sentiment. Moreover, we find evidence that financial stability communications by central banks with some governance characteristics are effective at alleviating the deterioration of the financial cycle and the occurrence of crises even after controlling for the implementation of policy actions.

References

Allen, F., Francke, L., Swinburne, M. W., 2004. Assessment of the Riskbank's work on financial stability issues Sveriges Riskbank Economic Review.

Armelius, H., Bertsch, C., Hull, I., Zhang, X., 2018. Spread the Word: International Spillovers from Central Bank Communication. Working Paper Series 357, Sveriges Riksbank (Central Bank of Sweden).

Arseneau, D. M., 2020. Central Bank Communication with a Financial Stability Objective. Finance and Economics Discussion Series 2020-087, Board of Governors of the Federal Reserve System (U.S.).

Blinder, A. S., Ehrmann, M., Fratzscher, M., Haan, J. D., Jansen, D.-J., 2008. Central bank communication and monetary policy: A survey of theory and evidence. Journal of Economic Literature 46, 910–945.

Borio, C., 2014. The financial cycle and macroeconomics: What have we learnt? Journal of Banking and Finance 45, 182–198.

Born, B., Ehrmann, M., Fratzscher, M., 2014. Central bank communication on financial stability. Economic Journal 124, 701–734.

Brownlees, C. T., Engle, R. F., 2016. SRISK: A conditional capital shortfall measure of systemic risk. The Review of Financial Studies (forthcoming).

Cerutti, E., Correa, R., Fiorentino, E., Segalla, E., 2016. Changes in Prudential Policy Instruments — A New Cross-Country Database Working paper, International Monetary Fund.

Chinn, M., Ito, H., 2006. What matters for financial development? Capital controls, institutions, and interactions. Journal of Developments Economics 81, 163–192.

Cihak, M., 2006. How do central banks write on financial stability? Unpublished working paper. International Monetary Fund.

Cihak, M., Muñoz, S., Ten Sharifuddin, S., Tintchev, K., 2012. Financial stability reports: What are they good for? Unpublished working paper. International Monetary Fund.

Claessens, S., van Horen, N., 2014. Foreign banks: Trends and impact. Journal of Money, Credit, and Banking 46, 295–326.

Correa, R., Edge, R. M., Liang, J. N., 2017a. A New Dataset of Macroprudential Policy Governance Structures. IFDP Notes 2017-11-07, Working paper, Board of Governors of the Federal Reserve System (U.S.).

Correa, R., Garud, K., Londono, J. M., Mislang, N., 2017b. Constructing a Dictionary for Financial Stability IFDP Notes. Washington: Board of Governors of the Federal Reserve System, June 2017.

Correa, R., Garud, K., Londono, J. M., Mislang, N., 2017c. Sentiment in Central Banks' Financial Stability Reports Working paper, Board of Governors of the Federal Reserve System (U.S.).

Cukierman, A., 2009. The limits of transparency. Economic notes 38, 1–37.

Dincer, N. N., Eichengreen, B., 2014. Central Bank Transparency and Indepence: Updates and New Measures. International Journal of Central Banking 10, 189 –253.

Drehmann, M., Illes, A., Juseliusm, M., Santos, M., 2015. How much income is used for debt payments? A new database for debt service ratios. BIS Quarterly Review, September .

Edge, R. M., Liang, J. N., 2017. New Financial Stability Governance Structures and Central Banks Working paper, Brookings institution.

Ehrmann, M., Fratzscher, M., 2007. The timing of central bank communication. European Journal of political Economy 23, 124–145.

Ericsson, N., 2016. Eliciting GDP forecasts from the FOMC's minutes around the financial crisis. International Journal of Forecasting 32, 571–583.

Garriga, A. C., 2016. Central bank independence in the world. A new dataset. International Interactions 42, 849–868.

Harris, R., Karadotchev, V., Sowerbutts, R., Stoja, E., 2019. Have FSRs got news for you? Evidence from the impact of Financial Stability Reports on market activity. Bank of England working papers 792, Bank of England.

Huang, C., Simpson, S., Ulybina, D., Roitman, A., 2019. News-based Sentiment Indicators. IMF Working Papers 19/273, International Monetary Fund.

Jeanneau, S., 2014. Financial stability objectives and arrangements—What is new? BIS papers No. 76.

Masciandaro, D., Volpicella, A., 2016. Macro prudential governance and central banks: Facts and drivers. Journal of international money and finance 61, 101–119.

Morris, S., Shin, H. S., 2002. Social value of public information. The American Economic Review 92, 1521–1534.

Osterloo, S., de Haan, J., Jong-A-Pin, R., 2011. Financial stability reviews: A first empirical analysis. Journal of Financial Stability 2, 337–355.

Stein, J., 2019. Can policy tame the credit cycle? Remarks by Jeremy Stein At the IMF Mundell-Fleming Lecture, Washington, District of Columbia [Accessed: 2019 12 19].

Stekler, H. O., Symington, H., 2016. Evaluating qualitative forecasts: The FOMC minutes, 2006–2010. International Journal of Forecasting 32, 559–570.

Wooldridge, J., 2002. Econometric Analysis of Cross Section and Panel Data. MIT press.

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	Committee with powers	Date	Financial stability mandate	Oversight	Date (year)
Argentina	N				Y	Y	
Australia	Y		N		Y	N	
Austria	Y	8-Sep-14	Y	8-Sep-14	Y	Y	
Belgium	N	31-Jul-10	N		Y	Y	2011
Canada	D		N		Y	N	
Chile	Y	31-Jul-11	N	31-Jul-11	Y	N	
Czech Republic	N				Y	Y	
Denmark	Y	28-Feb-13	N	28-Feb-13	Y	N	
Germany	Y	31-Jan-13	N	31-Jan-13	Y	Y	
Hong Kong	Y		N		Y	Y	
Hungary	N[1]	16-Sep-13	N	1-Jan-10	Y	Y	2013
Indonesia	Y[2]	30-Dec-05	N	30-Dec-05	Y	N	2014
Netherlands	N				Y	Y	
New Zealand	D	1-Jan-06	N	1-Jan-06	Y	Y	
Norway	Y[3]	1-Dec-08	Y	1-Nov-15	Y	N	
Poland	N				N	N	
Portugal	N				Y	Y	
Singapore	N				Y	Y	
South Africa	D	1-Jun-08	N	1-Jun-08	Y	Y	
Spain	D	17-Jan-12	N	17-Jan-12	Y	Y	
Sweden	Y	19-Dec-13	N	19-Dec-13	Y	N	
Switzerland	D	23-Feb-10	N	23-Feb-10	Y	N	
Turkey	Y	8-Jun-11	N	8-Jun-11	Y	N	
United Kingdom	D[4]	28-Feb-11	Y	19-Dec-12	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	-3.49	-3.00	6.27	-12.70	9.90	2
Australia	-0.83	-2.10	11.37	-15.90	18.00	2
Austria	-4.27	-4.20	4.04	-9.50	1.60	2
Belgium	1.28	1.80	10.08	-17.40	23.30	4
Canada	5.59	6.10	6.22	-8.10	15.60	5
Chile	0.19	1.70	10.32	-17.20	21.00	3
Czech Republic	9.60	10.20	7.22	-1.80	19.70	5
Denmark	2.28	5.20	24.43	-32.20	34.50	4
Germany	-7.05	-7.40	4.69	-14.60	4.40	0
Hong Kong	20.19	21.10	14.80	-4.30	49.80	9
Hungary	0.67	1.30	23.42	-29.70	44.60	4
Indonesia	3.13	5.50	7.68	-12.50	13.20	7
Netherlands	-3.24	-2.20	11.56	-30.40	14.60	3
New Zealand	-7.96	-15.10	13.69	-24.30	15.10	2
Norway	7.39	7.30	11.53	-17.80	29.90	5
Poland	0.42	0.50	5.97	-11.00	15.30	6
Portugal	-7.35	5.40	26.92	-47.80	24.20	4
Singapore	3.55	2.70	12.41	-17.90	25.60	9
South Africa	1.01	-2.00	5.45	-4.80	13.00	2
Spain	-7.84	-5.60	36.58	-53.50	44.00	1
Sweden	8.66	5.60	13.36	-8.80	38.80	6
Switzerland	5.46	8.70	7.46	-9.70	15.00	4
Turkey	8.43	9.80	5.09	-7.40	15.40	7
UnitedKingdom	-9.90	-14.80	14.02	-31.50	11.00	4

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	-1.24	9.63	-18.53	32.14
Australia	1.08	3.25	-5.40	6.37
Austria	0.43	1.76	-3.21	4.24
Belgium	2.38	5.19	-6.80	13.00
Canada	2.61	2.84	-1.90	10.54
Chile	3.42	6.52	-7.27	22.21
Czech Republic	3.00	4.52	-5.26	12.67
Denmark	1.02	3.95	-5.18	8.51
Germany	-0.76	2.63	-7.83	3.67
Hong Kong	4.53	5.49	-4.01	19.12
Hungary	0.30	8.41	-10.81	23.13
Indonesia	2.88	7.28	-13.49	17.33
Netherlands	0.93	3.06	-3.71	7.82
New Zealand	0.42	3.59	-4.92	8.78
Norway	2.00	4.28	-5.57	10.27
Poland	4.93	7.26	-5.68	26.50
Portugal	-0.44	4.61	-6.97	6.94
Singapore	2.62	5.40	-7.45	14.08
South Africa	1.49	5.01	-6.39	14.19
Spain	-0.41	5.84	-8.12	12.21
Sweden	3.25	4.37	-5.58	14.07
Switzerland	1.85	2.05	-2.70	7.98
Turkey	9.69	11.81	-16.13	53.16
UnitedKingdom	-0.24	3.12	-6.70	5.61

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	21.06	1.14	19.50	24.40
Austria	NA	NA	NA	NA
Belgium	19.60	1.53	16.70	22.40
Canada	21.38	1.74	18.50	24.20
Chile	NA	NA	NA	NA
Czech Republic	7.22	0.69	5.70	8.20
Denmark	26.22	2.67	22.40	31.60
Germany	10.83	0.74	10.00	12.40
Hong Kong	20.63	3.70	14.00	28.00
Hungary	12.57	3.55	7.00	19.20
Indonesia	3.79	0.53	3.00	4.70
Netherlands	27.27	1.90	24.00	30.70
New Zealand	NA	NA	NA	NA
Norway	26.68	2.25	21.50	30.00
Poland	7.15	0.97	5.00	8.40
Portugal	18.15	2.01	14.30	21.20
Singapore	NA	NA	NA	NA
South Africa	8.72	0.99	7.60	11.20
Spain	18.71	3.32	13.40	24.10
Sweden	22.01	1.63	18.40	23.90
Switzerland	17.09	0.75	15.30	18.20
Turkey	11.37	4.92	5.10	27.40
United Kingdom	16.84	1.90	14.40	20.30

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:

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

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	Official committee	Committee with power	Financial Stability mandate	Oversight	Committee and oversight	Committee and no oversight	Oversight and no committee
AR coefficient	0.91***	0.90***	0.90***	0.91***	0.91***	0.91***	0.91***	0.91***	0.91***
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Constant	0.01	0.07	0.01	-0.03	-0.02	-0.02	-0.02	-0.01	0.01
	(0.48)	(0.45)	(0.48)	(0.43)	(0.48)	(0.47)	(0.48)	(0.46)	(0.46)
FSS (β_1)	-0.45	0.16	-0.31	-0.52	-1.06	-0.54	-0.37	-0.29	-0.61
	(0.47)	(0.52)	(0.48)	(0.41)	(0.92)	(0.41)	(0.44)	(0.51)	(0.46)
D*FSS (β_2)		-1.24*	-0.58	1.91	0.67	0.24	-0.55	-0.53	0.63
		(0.51)	(0.71)	(1.01)	(1.03)	(0.58)	(0.53)	(0.77)	(0.73)
$\beta_1 + \beta_2$		-1.08*	-0.89	1.39	-0.39	-0.29	-0.91	-0.82	0.02
		(0.50)	(0.73)	(1.09)	(0.48)	(0.66)	(0.77)	(0.70)	(0.75)
R^2	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
N	1594.00	1572.00	1572.00	1572.00	1572.00	1572.00	1572.00	1572.00	1572.00

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

Panel B. Credit growth

	Homogeneous	Committee	Official committee	Committee with power	Financial Stability mandate	Oversight	Committee and oversight	Committee and no oversight	Oversight and no committee
AR coefficient	0.23**	0.22**	0.23**	0.23**	0.23**	0.23**	0.23**	0.23**	0.23**
	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)
Constant	1.73***	1.85***	1.78***	1.72***	1.73***	1.74***	1.73***	1.74***	1.75***
	(0.32)	(0.30)	(0.32)	(0.32)	(0.31)	(0.32)	(0.32)	(0.31)	(0.32)
FSS (β_1)	-0.34	0.09	-0.25	-0.35	-2.08	-0.19	-0.31	-0.24	-0.43
	(0.35)	(0.37)	(0.36)	(0.34)	(1.40)	(0.37)	(0.34)	(0.38)	(0.36)
D*FSS (β_2)		-0.94*	-0.45	0.31	1.83	-0.34	-0.29	-0.36	0.31
		(0.34)	(0.38)	(1.22)	(1.41)	(0.49)	(0.41)	(0.42)	(0.42)
$\beta_1 + \beta_2$		-0.85*	-0.71	-0.04	-0.25	-0.54	-0.60	-0.60	-0.12
		(0.38)	(0.47)	(1.29)	(0.35)	(0.49)	(0.54)	(0.42)	(0.47)
R^2	0.06	0.08	0.06	0.06	0.07	0.06	0.06	0.06	0.06
N	1501.00	1501.00	1501.00	1501.00	1501.00	1501.00	1501.00	1501.00	1501.00

Panel C. Debt service ratio

	Homogeneous	Committee	Official committee	Committee with power	Financial Stability mandate	Oversight	Committee and oversight	Committee and no oversight	Oversight and no committee
AR coefficient	0.82***	0.81***	0.80***	0.81***	0.81***	0.80***	0.81***	0.81***	0.81***
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.05)	(0.06)	(0.06)	(0.06)
Constant	3.30**	3.44**	3.56**	3.48**	3.37**	3.58***	3.37**	3.36**	3.35**
	(0.91)	(0.93)	(0.94)	(0.95)	(0.94)	(0.85)	(0.95)	(0.93)	(0.93)
FSS (β_1)	-0.22	-0.12	-0.16	-0.24	-0.73	-0.12	-0.22	-0.22	-0.24
	(0.13)	(0.13)	(0.10)	(0.14)	(0.40)	(0.15)	(0.13)	(0.15)	(0.14)
D*FSS (β_2)		-0.21**	-0.46**	-0.54***	0.52	-0.34	-0.12	-0.02	0.05
		(0.07)	(0.15)	(0.12)	(0.44)	(0.23)	(0.12)	(0.09)	(0.12)
$\beta_1 + \beta_2$		-0.34*	-0.62**	-0.78**	-0.21	-0.46*	-0.34	-0.25*	-0.20
		(0.14)	(0.21)	(0.21)	(0.14)	(0.20)	(0.19)	(0.11)	(0.14)
R^2	0.61	0.61	0.62	0.61	0.61	0.61	0.61	0.61	0.61
N	1213.00	1196.00	1196.00	1196.00	1196.00	1196.00	1196.00	1196.00	1196.00

Table 7: Other country-specific characteristics and heterogeneous effects of FSS for financial cycle indicators

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

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

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 participates in an interagency financial stability committee 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. $X_{i,t}$ is one of the following country-specific characteristics: the transparency index in Dincer and Eichengreen (2014), the central bank independence index in Garriga (2016), the financial openness index in Chinn and Ito (2006), the foreign bank ownership index in Claessens and van Horen (2014), the ratio of total international banking claims from the BIS, and a dummy that takes the value of one when English is one of the native languages of the country and zero otherwise. 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.

A. Credit-to-GDP gap

	Transparency	Independence	Fnancial openness	Foreign bank ownership	Bank international claims	English native language
AR coefficient	0.85***	0.92***	0.90***	0.90***	0.91***	0.90***
	(0.04)	(0.02)	(0.03)	(0.04)	(0.07)	(0.03)
Constant	0.89*	0.18	0.09	0.13	1.01*	0.06
	(0.40)	(0.46)	(0.47)	(0.45)	(0.41)	(0.47)
FSS (β_1)	3.29	-0.94	0.07	0.24	1.69	0.12
	(1.72)	(1.23)	(0.67)	(0.67)	(1.02)	(0.55)
$D_{committee} * FSS$ (β_2)	-1.26*	-1.24*	-1.15*	-1.35*	-2.19***	-1.24*
	(0.48)	(0.52)	(0.51)	(0.50)	(0.51)	(0.51)
$X * FSS(\beta_3)$	-0.30	0.86	-0.00	-0.00	-2.60	0.15
	(0.15)	(1.31)	(0.02)	(0.00)	(1.62)	(0.99)
R^2	0.76	0.85	0.82	0.81	0.69	0.82
N	1242.00	1303.00	1542.00	1485.00	873.00	1572.00

Table 7: Other country-specific characteristics and heterogeneous effects of FSS for financial cycle indicators, continued

B. Credit growth

	Transparency	Independence	Fnancial openness	Foreign bank ownership	Bank international claims	English native language
AR coefficient	0.18*	0.28**	0.22**	0.25**	0.13	0.22**
	(0.08)	(0.09)	(0.08)	(0.08)	(0.09)	(0.08)
Constant	2.45***	2.09***	1.88***	1.97***	3.45***	1.84***
	(0.29)	(0.37)	(0.32)	(0.32)	(0.38)	(0.31)
FSS (β_1)	1.07	-1.82	0.03	-0.07	1.45	0.05
	(1.33)	(1.87)	(0.46)	(0.50)	(1.05)	(0.40)
$D_{committee} * FSS$ (β_2)	-1.02*	-0.87*	-0.86*	-0.99**	-1.85**	-0.94*
	(0.42)	(0.34)	(0.35)	(0.35)	(0.52)	(0.34)
$X * FSS(\beta_3)$	-0.10	1.78	-0.00	0.00	-2.51	0.16
	(0.11)	(1.77)	(0.01)	(0.00)	(1.40)	(0.73)
R^2	0.06	0.12	0.07	0.09	0.10	0.08
N	1189.00	1241.00	1485.00	1414.00	805.00	1501.00

C. Debt service ratio

AR coefficient	0.77***	0.81***	0.80***	0.87***	0.55***	0.81***
	(0.06)	(0.06)	(0.06)	(0.09)	(0.09)	(0.06)
Constant	3.92**	3.50**	3.51***	2.54	7.72***	3.44**
	(0.99)	(0.97)	(0.88)	(1.29)	(1.43)	(0.92)
FSS (β_1)	-0.00	-1.17	-0.23	-0.24	0.21	-0.13
	(0.52)	(0.78)	(0.17)	(0.25)	(0.33)	(0.15)
$D_{committee} * FSS$ (β_2)	-0.21*	-0.19**	-0.20*	-0.19*	-0.25	-0.21**
	(0.10)	(0.07)	(0.07)	(0.07)	(0.12)	(0.07)
$X * FSS(\beta_3)$	-0.01	1.15	0.01	0.00	-0.37	0.02
	(0.04)	(0.81)	(0.00)	(0.00)	(0.55)	(0.26)
R^2	0.56	0.62	0.61	0.63	0.35	0.61
N	921.00	1141.00	1186.00	1130.00	690.00	1196.00

Table 8: 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	Official committee	Committee with power	Financial Stability mandate	Oversight	Committee and oversight	Committee and no oversight	Oversight and no committee
AR Coefficient	0.91***	0.90***	0.90***	0.91***	0.90***	0.91***	0.90***	0.90***	0.90***
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Constant	0.01	0.11	0.06	0.03	0.02	0.02	0.02	0.04	0.05
	(0.48)	(0.45)	(0.47)	(0.43)	(0.48)	(0.47)	(0.48)	(0.46)	(0.46)
FSS (β_1)	-0.45	-0.06	-0.49	-0.71	-1.15	-0.77	-0.55	-0.49	-0.81
	(0.47)	(0.54)	(0.50)	(0.41)	(0.96)	(0.41)	(0.45)	(0.51)	(0.45)
D*FSS (β_2)		-1.15*	-0.55	1.87	0.57	0.35	-0.45	-0.46	0.67
		(0.53)	(0.74)	(0.94)	(1.07)	(0.57)	(0.54)	(0.75)	(0.76)
TP*FSS (β_3)		1.91***	1.60***	1.70***	0.94***	1.72***	1.74***	2.02***	1.65***
		(0.48)	(0.32)	(0.31)	(0.12)	(0.35)	(0.35)	(0.41)	(0.36)
D*TP*FSS (β_4)		-0.57	0.93	2.09*	0.81*	0.09	-0.76	-0.86	0.73
		(0.65)	(1.30)	(0.92)	(0.34)	(0.65)	(1.75)	(0.45)	(0.62)
$\beta_1 + \beta_3$		1.86**	1.10*	0.99*	-0.21	0.95	1.19*	1.53*	0.84
		(0.65)	(0.47)	(0.45)	(0.92)	(0.47)	(0.51)	(0.65)	(0.58)
$\beta_1 + \beta_2 + \beta_3 + \beta_4$		0.13	1.49	4.95***	1.18*	1.40	-0.02	0.21	2.24**
		(0.69)	(1.49)	(0.19)	(0.55)	(1.01)	(1.96)	(0.70)	(0.66)
R^2	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
N	1594.00	1572.00	1572.00	1572.00	1572.00	1572.00	1572.00	1572.00	1572.00

Table 8: Governance frameworks and heterogeneous effects of FSS for financial cycle indicators around crises, continued

Panel B. Credit growth

	Homogeneous	Committee	Official committee	Committee with power	Financial Stability mandate	Oversight	Committee and oversight	Committee and no oversight	Oversight and no committee
AR Coefficient	0.23**	0.21**	0.22**	0.23**	0.23**	0.22**	0.23**	0.23**	0.22**
	(0.08)	(0.07)	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)
Constant	1.73***	1.89***	1.82***	1.78***	1.78***	1.79***	1.78***	1.80***	1.80***
	(0.32)	(0.29)	(0.31)	(0.31)	(0.31)	(0.32)	(0.31)	(0.30)	(0.31)
FSS (β_1)	-0.34	-0.10	-0.40	-0.50	-2.15	-0.37	-0.46	-0.42	-0.59
	(0.35)	(0.36)	(0.35)	(0.33)	(1.45)	(0.35)	(0.33)	(0.37)	(0.35)
D*FSS (β_2)		-0.83*	-0.40	0.27	1.76	-0.27	-0.23	-0.27	0.36
		(0.34)	(0.38)	(1.18)	(1.46)	(0.48)	(0.44)	(0.41)	(0.43)
TP*FSS (β_3)		1.63***	1.24***	1.26***	0.83	1.21***	1.31***	1.65***	1.27***
		(0.41)	(0.26)	(0.25)	(0.45)	(0.27)	(0.25)	(0.33)	(0.27)
D*TP*FSS (β_4)		-0.86	0.29	1.65	0.48	0.24	-0.46	-1.00*	0.33
		(0.46)	(0.74)	(1.15)	(0.50)	(0.52)	(1.32)	(0.40)	(0.42)
$\beta_1 + \beta_3$		1.53**	0.84	0.76	-1.32	0.85	0.85	1.22*	0.68
		(0.53)	(0.41)	(0.41)	(1.27)	(0.45)	(0.42)	(0.46)	(0.45)
$\beta_1 + \beta_2 + \beta_3 + \beta_4$		-0.16	0.73	2.67***	0.92*	0.81	0.17	-0.04	1.37**
		(0.47)	(0.86)	(0.35)	(0.41)	(0.68)	(1.13)	(0.52)	(0.45)
R^2	0.06	0.09	0.08	0.08	0.08	0.07	0.07	0.08	0.08
N	1501.00	1501.00	1501.00	1501.00	1501.00	1501.00	1501.00	1501.00	1501.00

Table 8: Governance frameworks and heterogeneous effects of FSS for financial cycle indicators around crises, continued

Panel C. Debt service ratio

	Homogeneous	Committee	Official committee	Committee with power	Financial Stability mandate	Oversight	Committee and oversight	Committee and no oversight	Oversight and no committee
AR Coefficient	0.82***	0.81***	0.80***	0.81***	0.81***	0.80***	0.81***	0.81***	0.81***
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.05)	(0.06)	(0.06)	(0.06)
Constant	3.30**	3.50***	3.60***	3.52**	3.41**	3.61***	3.41**	3.42**	3.40**
	(0.91)	(0.91)	(0.92)	(0.94)	(0.92)	(0.84)	(0.93)	(0.92)	(0.92)
FSS (β_1)	-0.22	-0.16	-0.18	-0.25	-0.68	-0.14	-0.24	-0.25	-0.26
	(0.13)	(0.13)	(0.09)	(0.13)	(0.35)	(0.15)	(0.13)	(0.15)	(0.14)
D*FSS (β_2)		-0.18*	-0.43**	-0.52***	0.45	-0.33	-0.09	-0.01	0.04
		(0.07)	(0.13)	(0.12)	(0.38)	(0.22)	(0.11)	(0.09)	(0.12)
TP*FSS (β_3)		0.30**	0.18**	0.15*	-0.36	0.13*	0.19**	0.23*	0.15*
		(0.10)	(0.06)	(0.06)	(0.52)	(0.05)	(0.06)	(0.08)	(0.06)
D*TP*FSS (β_4)		-0.29	-0.48	0.00	0.55	0.06	-0.52	-0.15	0.13
		(0.16)	(0.60)	(.)	(0.53)	(0.22)	(0.68)	(0.10)	(0.12)
$\beta_1 + \beta_3$		0.14	0.00	-0.10	-1.03	-0.01	-0.05	-0.02	-0.10
		(0.14)	(0.10)	(0.16)	(0.86)	(0.17)	(0.14)	(0.21)	(0.17)
$\beta_1 + \beta_2 + \beta_3 + \beta_4$		-0.33	-0.91	-0.62*	-0.03	-0.28	-0.66	-0.18*	0.07
		(0.20)	(0.73)	(0.25)	(0.16)	(0.36)	(0.74)	(0.09)	(0.16)
R^2	0.61	0.61	0.62	0.61	0.61	0.61	0.61	0.61	0.61
N	1213.00	1196.00	1196.00	1196.00	1196.00	1196.00	1196.00	1196.00	1196.00

Table 9: 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 $X_{i,t}$ contains the demeaned financial stability sentiment index calculated using the text in FSRs, $FSS_{i,t}$. 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		Official commitee		Committee with powers		Financial stability mandate		Oversight	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Constant	-1.71***	-1.67***	-1.79***	-1.66***	-2.32***	-1.68***	-1.72***	-1.34***	-1.83***	-1.56***
	0.09	0.09	0.12	0.08	0.42	0.07	0.07	0.04	0.11	0.08
FSS	0.05	0.26**	-0.16	0.25**	-1.03***	0.21**	0.17	0.24	0.03	0.25**
	0.13	0.10	0.18	0.08	0.16	0.07	0.10	0.16	0.14	0.09
R^2	0.00	0.03	0.01	0.02	0.13	0.01	0.01	0.01	0.00	0.02
N	1140.00	906.00	729.00	1317.00	174.00	1872.00	1880.00	166.00	1119.00	927.00

Table 10: 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 participates in an interagency financial stability committee and zero otherwise, $X_{i,t}$ is each one of the financial cycle characteristics. 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.

	CGDP Gap	Log of CGDP	Credit growth	DSR	SRISK to GDP	Bank CDS	Bank volatility	Log of prop. price	Log of hshold credit
AR Coefficient	0.23***	0.24***	0.24***	0.23***	0.20***	0.23***	0.24***	0.26***	0.24***
	(0.04)	(0.04)	(0.04)	(0.05)	(0.05)	(0.05)	(0.04)	(0.04)	(0.04)
Constant	0.31	-0.90	0.85***	-0.54	0.71***	0.75***	0.41***	1.16	-0.52
	(0.32)	(1.48)	(0.05)	(0.48)	(0.07)	(0.07)	(0.11)	(0.92)	(1.14)
RHS variable (β_1)	0.01*	0.40	0.04***	0.10**	0.08***	0.16	0.02**	-0.03	0.40
	(0.00)	(0.31)	(0.01)	(0.03)	(0.02)	(0.09)	(0.01)	(0.20)	(0.30)
D*RHS (β_2)	-0.00*	-0.05*	-0.02	-0.02*	-0.01	0.01	0.00	-0.05*	-0.07**
	(0.00)	(0.02)	(0.02)	(0.01)	(0.02)	(0.07)	(0.00)	(0.02)	(0.02)
$\beta_1 + \beta_2$	0.00	0.43	0.01	0.09*	0.09**	0.16*	0.02***	-0.34	0.38
	(0.00)	(0.33)	(0.02)	(0.03)	(0.02)	(0.07)	(0.01)	(0.18)	(0.30)
R^2	0.09	0.08	0.11	0.15	0.12	0.12	0.19	0.09	0.09
N	1332.00	1332.00	1309.00	998.00	1272.00	921.00	1498.00	1491.00	1323.00

Table 11: Strategic communication, deviations between FSS and the sentiment in news articles

This table reports the results for a lead-lag analysis between FSS and the financial stability from news articles, NS. NS is calculated as explained in section 4.2 Panel A shows the results for the following regression setting, in which we explore how information from NS is collected in the one-month-ahead FSS index:

$$FSS_{i,t+1} = \alpha_i + (\beta_1 + \beta_2 D_{i,t-1})NS_{i,t} + e_{i,t+1}.$$

Panel B shows the results for the following contemporaneous regression setting:

$$FSS_{i,t} = \alpha_i + (\beta_1 + \beta_2 D_{i,t-1})NS_{i,t} + e_{i,t}.$$

Finally, panel C shows the results for the following regression setting, in which we explore how information from FSS is collected in the one-month-ahead NS index:

$$NS_{i,t+1} = \alpha_i + (\beta_1 + \beta_2 D_{i,t-1})FSS_{i,t} + e_{i,t+1}.$$

In all regressions, $D_{i,t-1}$ 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. 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

	Committee	Official committee	Committee with power	Financial Stability mandate	Oversight	Committee and oversight	Committee and no oversight	Oversight and no committee
Constant	0.65***	0.65***	0.63***	0.65***	0.65***	0.64***	0.64***	0.65***
	(0.04)	(0.05)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
NS (β_1)	0.57***	0.56***	0.50***	0.09	0.44***	0.49***	0.47***	0.42***
	(0.06)	(0.06)	(0.06)	(0.18)	(0.07)	(0.06)	(0.06)	(0.06)
D*NS (β_2)	-0.20*	-0.27**	-0.31**	0.41*	0.07	-0.10	0.04	0.21*
	(0.08)	(0.08)	(0.09)	(0.19)	(0.11)	(0.08)	(0.11)	(0.09)
$\beta_1 + \beta_2$	0.33***	0.28***	0.23***	0.44***	0.38***	0.29***	0.32***	0.37***
	(0.04)	(0.04)	(0.04)	(0.04)	(0.05)	(0.04)	(0.04)	(0.05)
R^2	0.17	0.18	0.17	0.16	0.16	0.16	0.16	0.17
N	1660.00	1660.00	1660.00	1660.00	1660.00	1660.00	1660.00	1660.00

Table 11: Strategic communication, deviations between FSS and the sentiment in news articles, continued

Panel B

	Committee	Official committee	Committee with power	Financial Stability mandate	Oversight	Committee and oversight	Committee and no oversight	Oversight and no committee
Constant	0.68***	0.67***	0.65***	0.67***	0.67***	0.66***	0.66***	0.68***
	(0.03)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.03)
NS (β_1)	0.53***	0.51***	0.46***	0.11	0.38***	0.44***	0.43***	0.37***
	(0.05)	(0.06)	(0.05)	(0.17)	(0.06)	(0.05)	(0.05)	(0.05)
D*NS (β_2)	-0.21**	-0.27**	-0.29**	0.35	0.09	-0.06	0.00	0.21**
	(0.07)	(0.08)	(0.08)	(0.17)	(0.09)	(0.06)	(0.10)	(0.07)
$\beta_1 + \beta_2$	0.32***	0.24**	0.17	0.45***	0.47***	0.38***	0.43***	0.59***
	(0.06)	(0.07)	(0.08)	(0.05)	(0.07)	(0.06)	(0.10)	(0.07)
R^2	0.14	0.15	0.14	0.13	0.13	0.13	0.13	0.14
N	1685.00	1685.00	1685.00	1685.00	1685.00	1685.00	1685.00	1685.00

Panel C

	Committee	Official committee	Committee with power	Financial Stability mandate	Oversight	Committee and oversight	Committee and no oversight	Oversight and no committee
Constant	0.55***	0.55***	0.54***	0.54***	0.55***	0.54***	0.54***	0.55***
	(0.05)	(0.05)	(0.05)	(0.05)	(0.04)	(0.05)	(0.05)	(0.04)
FSS (β_1)	0.29***	0.26***	0.24***	0.05	0.16**	0.23***	0.26***	0.19***
	(0.05)	(0.05)	(0.05)	(0.10)	(0.05)	(0.05)	(0.05)	(0.04)
D*FSS (β_2)	-0.11*	-0.08	-0.15	0.20	0.21*	0.09	-0.06	0.18*
	(0.05)	(0.06)	(0.13)	(0.11)	(0.09)	(0.11)	(0.05)	(0.07)
$\beta_1 + \beta_2$	0.26***	0.27***	0.28***	0.31***	0.37***	0.32***	0.27***	0.36***
	(0.04)	(0.04)	(0.04)	(0.05)	(0.05)	(0.05)	(0.04)	(0.05)
R^2	0.09	0.09	0.09	0.09	0.10	0.09	0.09	0.10
N	1656.00	1656.00	1656.00	1656.00	1656.00	1656.00	1656.00	1656.00

Table 12: 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 the cumulative macroprudential index from Cerutti et al. (2016) (Panel A) or the monetary policy rate (panel B). $D_{i,t-1}$ 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	Official committee	Committee with power	Financial Stability mandate	Oversight	Committee and oversight	Committee and no oversight	Oversight and no committee
AR coefficient	0.95***	0.93***	0.94***	0.94***	0.94***	0.94***	0.94***	0.92***	0.94***
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.06)	(0.05)
Constant	0.41***	0.44***	0.43***	0.44***	0.43***	0.43***	0.43***	0.44***	0.43***
	(0.09)	(0.09)	(0.10)	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)
FSS (β_1)	-0.03	-0.18**	-0.09	-0.06	-0.45***	-0.05	-0.05	-0.15*	-0.04
	(0.07)	(0.06)	(0.07)	(0.07)	(0.07)	(0.09)	(0.06)	(0.07)	(0.09)
D*FSS (β_2)		0.34***	0.30	0.60***	0.42***	0.02	0.05	0.44***	-0.01
		(0.09)	(0.16)	(0.08)	(0.09)	(0.11)	(0.17)	(0.12)	(0.11)
$\beta_1 + \beta_2$		0.16	0.21	0.54***	-0.02	-0.03	-0.00	0.29**	-0.05
		(0.10)	(0.15)	(0.06)	(0.07)	(0.08)	(0.18)	(0.10)	(0.07)
R^2	0.70	0.71	0.70	0.70	0.70	0.70	0.70	0.71	0.70
N	1234.00	1207.00	1207.00	1207.00	1207.00	1207.00	1207.00	1207.00	1207.00

Panel B. Monetary policy rate

AR coefficient	0.70***	0.70***	0.70***	0.71***	0.71***	0.71***	0.71***	0.71***	0.71***
	(0.03)	(0.03)	(0.04)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Constant	1.62***	1.52***	1.55***	1.49***	1.48***	1.50***	1.48***	1.49***	1.49***
	(0.20)	(0.18)	(0.19)	(0.17)	(0.17)	(0.16)	(0.17)	(0.17)	(0.17)
FSS (β_1)	-0.57***	-0.51***	-0.51***	-0.56***	-0.68***	-0.52***	-0.57***	-0.55***	-0.58***
	(0.11)	(0.08)	(0.07)	(0.09)	(0.17)	(0.13)	(0.10)	(0.10)	(0.11)
D*FSS (β_2)		-0.11	-0.29	-0.09	0.13	-0.11	0.01	-0.04	0.06
		(0.10)	(0.19)	(0.17)	(0.20)	(0.15)	(0.10)	(0.07)	(0.10)
$\beta_1 + \beta_2$		-0.62***	-0.80**	-0.65**	-0.56***	-0.63***	-0.55***	-0.60***	-0.52***
		(0.13)	(0.23)	(0.19)	(0.10)	(0.11)	(0.11)	(0.10)	(0.08)
R^2	0.39	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41
N	1469.00	1732.00	1732.00	1732.00	1732.00	1732.00	1732.00	1732.00	1732.00

Table 13: 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 $PA_{i,t}$ is either cumulative macroprudential index from Cerutti, Correa, Fiorentino, and Segalla (2016) (Panel A) or the monetary policy rate (panel B). $D_{i,t-1}$ 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	Official committee	Committee with power	Financial Stability mandate	Oversight	Committee and oversight	Committee and no oversight	Oversight and no committee
AR Coefficient	0.95***	0.98***	1.00***	1.00***	1.00***	1.00***	1.00***	0.99***	1.00***
	(0.05)	(0.04)	(0.04)	(0.04)	(0.05)	(0.04)	(0.04)	(0.04)	(0.04)
Constant	0.41***	0.46***	0.43***	0.43***	0.44***	0.43***	0.43***	0.44***	0.43***
	(0.09)	(0.09)	(0.10)	(0.09)	(0.09)	(0.10)	(0.09)	(0.09)	(0.09)
FSS (β_1)	-0.03	-0.13	-0.04	0.00	-0.40***	-0.01	-0.00	-0.08	0.03
	(0.07)	(0.07)	(0.07)	(0.07)	(0.08)	(0.09)	(0.07)	(0.07)	(0.09)
D*FSS (β_2)		0.34***	0.35*	0.64***	0.44***	0.07	0.16	0.36**	-0.03
		(0.09)	(0.14)	(0.11)	(0.10)	(0.11)	(0.19)	(0.11)	(0.11)
TP*FSS (β_3)		-0.06	-0.04	-0.07	-0.51	-0.02	-0.05	-0.12	-0.06
		(0.06)	(0.07)	(0.08)	(0.50)	(0.09)	(0.07)	(0.07)	(0.10)
D*TP*FSS (β_4)		-0.00	-0.70	-3.61***	0.45	-0.26	-1.08	0.10	-0.10
		(0.16)	(0.57)	(0.27)	(0.51)	(0.16)	(0.78)	(0.14)	(0.12)
$\beta_1 + \beta_3$		-0.19**	-0.08	-0.07	-0.91	-0.03	-0.05	-0.20**	-0.04
		(0.06)	(0.09)	(0.09)	(0.48)	(0.12)	(0.09)	(0.07)	(0.12)
$\beta_1 + \beta_2 + \beta_3 + \beta_4$		0.15	-0.43	-3.03***	-0.02	-0.22	-0.98	0.26	-0.17**
		(0.17)	(0.56)	(0.16)	(0.09)	(0.12)	(0.65)	(0.17)	(0.06)
R^2	0.70	0.74	0.74	0.74	0.74	0.73	0.74	0.74	0.73
N	1234.00	999.00	999.00	999.00	999.00	999.00	999.00	999.00	999.00

Table 13: Coherence in communication around crises, continued

Panel B. Monetary policy rate

	Homogeneous	Committee	Official committee	Committee with power	Financial Stability mandate	Oversight	Committee and oversight	Committee and no oversight	Oversight and no committee
AR Coefficient	0.70***	0.68***	0.67***	0.69***	0.69***	0.68***	0.69***	0.69***	0.69***
	(0.03)	(0.04)	(0.04)	(0.04)	(0.03)	(0.03)	(0.03)	(0.03)	(0.04)
Constant	1.62***	1.68***	1.71***	1.66***	1.65***	1.67***	1.65***	1.65***	1.65***
	(0.20)	(0.21)	(0.22)	(0.19)	(0.19)	(0.18)	(0.19)	(0.19)	(0.20)
FSS (β_1)	-0.57***	-0.48***	-0.48***	-0.54***	-0.64**	-0.46**	-0.55***	-0.52***	-0.55***
	(0.11)	(0.10)	(0.08)	(0.11)	(0.20)	(0.13)	(0.11)	(0.11)	(0.12)
D*FSS (β_2)		-0.12	-0.29	-0.09	0.10	-0.20	0.04	-0.06	0.01
		(0.11)	(0.19)	(0.17)	(0.23)	(0.17)	(0.13)	(0.07)	(0.12)
TP*FSS (β_3)		-0.25	-0.15	-0.17	-0.33	-0.26*	-0.15	-0.21	-0.16
		(0.16)	(0.10)	(0.10)	(0.46)	(0.10)	(0.10)	(0.14)	(0.10)
D*TP*FSS (β_4)		0.20	-0.12	0.99***	0.19	0.48	0.03	0.17	0.10
		(0.20)	(0.63)	(0.20)	(0.47)	(0.29)	(0.45)	(0.14)	(0.22)
$\beta_1 + \beta_3$		-0.73***	-0.64***	-0.72***	-0.96*	-0.72**	-0.69***	-0.73***	-0.70***
		(0.16)	(0.11)	(0.16)	(0.37)	(0.20)	(0.16)	(0.19)	(0.18)
$\beta_1 + \beta_2 + \beta_3 + \beta_4$		-0.65**	-1.04	0.18***	-0.67***	-0.45*	-0.62	-0.62***	-0.59**
		(0.23)	(0.83)	(0.04)	(0.16)	(0.21)	(0.38)	(0.12)	(0.18)
R^2	0.39	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.36
N	1469.00	1404.00	1404.00	1404.00	1404.00	1404.00	1404.00	1404.00	1404.00

Table 14: Governance frameworks and heterogeneous effects of FSS for financial cycle indicators, controlling for lagged policy actions

This table reports the results for the following augmented version of the panel-data regression setting in table 6:

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

where D is a dummy that takes the value of 1 if the central bank participates in an interagency financial stabiltiy committee, and we control for lagged policy actions. Specifically, $MP_{i,t}$ is the cumulative macroprudential index from Cerutti et al. (2016) and $IR_{i,t}$ the monetary policy rate. 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.

	Credit-to-GDP gap	Credit Growth	Debt service ratio
AR coefficient	0.92***	0.17**	0.59***
	(0.06)	(0.05)	(0.09)
Constant	-3.60**	0.09	4.95**
	(1.28)	(1.15)	(1.30)
FSS (β_1)	0.81	0.42	0.23
	(0.60)	(0.38)	(0.12)
D*FSS (β_2)	-1.52*	-1.38*	-0.22*
	(0.57)	(0.50)	(0.09)
$\beta_1 + \beta_2$	-0.70	-0.95	0.01
	(0.58)	(0.54)	(0.15)
MP	0.02	0.10	0.19**
	(0.25)	(0.17)	(0.06)
IR	0.97**	0.66**	0.39***
	(0.28)	(0.24)	(0.07)
R^2	0.76	0.15	0.52
N	872.00	812.00	706.00

Table 15: Governance frameworks and heterogeneous effects of FSS for financial cycle indicators, controlling for current policy actions

This table reports the results for the following augmented version of the panel-data regression setting in table 6:

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

where D is a dummy that takes the value of 1 if the central bank participates in an interagency financial stabiltiy committee, and we control for current policy actions. Specifically, $MP_{i,t}$ is the cumulative macroprudential index from Cerutti, Correa, Fiorentino, and Segalla (2016) and $IR_{i,t}$ the monetary policy rate. 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.

	Credit-to-GDP gap	Credit Growth	Debt service ratio
AR coefficient	0.91***	0.22**	0.57***
	(0.05)	(0.07)	(0.10)
Constant	-3.29*	0.58	5.98**
	(1.32)	(1.24)	(1.58)
FSS (β_1)	-0.02	-0.19	0.05
	(0.56)	(0.35)	(0.13)
D*FSS (β_2)	-1.08*	-0.90*	-0.19
	(0.51)	(0.43)	(0.12)
$\beta_1 + \beta_2$	-1.09	-1.09*	-0.14
	(0.58)	(0.48)	(0.14)
MP	0.14	0.12	0.19*
	(0.15)	(0.13)	(0.07)
IR	1.03**	0.58	0.25*
	(0.34)	(0.29)	(0.10)
R^2	0.80	0.15	0.49
N	969.00	909.00	783.00

Table 16: Governance frameworks and the heterogeneous predictive power of FSS for turning points in the financial cycle after controlling for policy actions

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 $X_{i,t}$ contains the demeaned financial stability sentiment index calculated using the text in FSRs, $FSS_{i,t}$, the cumulative macroprudential index from Cerutti et al. (2016), and the monetary policy rate. 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		Official commitee		Committee with powers		Financial stability mandate		Oversight	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Constant	-1.45***	-1.69***	-1.76***	-1.60***	-2.91***	-1.57***	-1.59***	-1.18***	-1.68***	-1.48***
	0.11	0.10	0.20	0.07	0.40	0.07	0.09	0.16	0.15	0.08
FSS	-0.05	0.29**	-0.48*	0.25***	-1.96***	0.18*	0.12	0.27	-0.09	0.22**
	0.14	0.09	0.21	0.07	0.14	0.07	0.10	0.22	0.22	0.08
MP	0.05**	0.03	0.05*	0.05**	0.21***	0.04**	0.04*	0.07***	0.07**	0.02
	0.02	0.04	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.01
IR	0.00	0.05**	0.04*	0.03	0.18*	0.03	0.04	-0.03	0.02	0.05*
	0.01	0.02	0.02	0.02	0.08	0.01	0.02	0.03	0.02	0.02
R^2	0.02	0.05	0.07	0.04	0.29	0.03	0.02	0.02	0.03	0.03
N	500.00	496.00	289.00	707.00	51.00	945.00	879.00	117.00	455.00	541.00

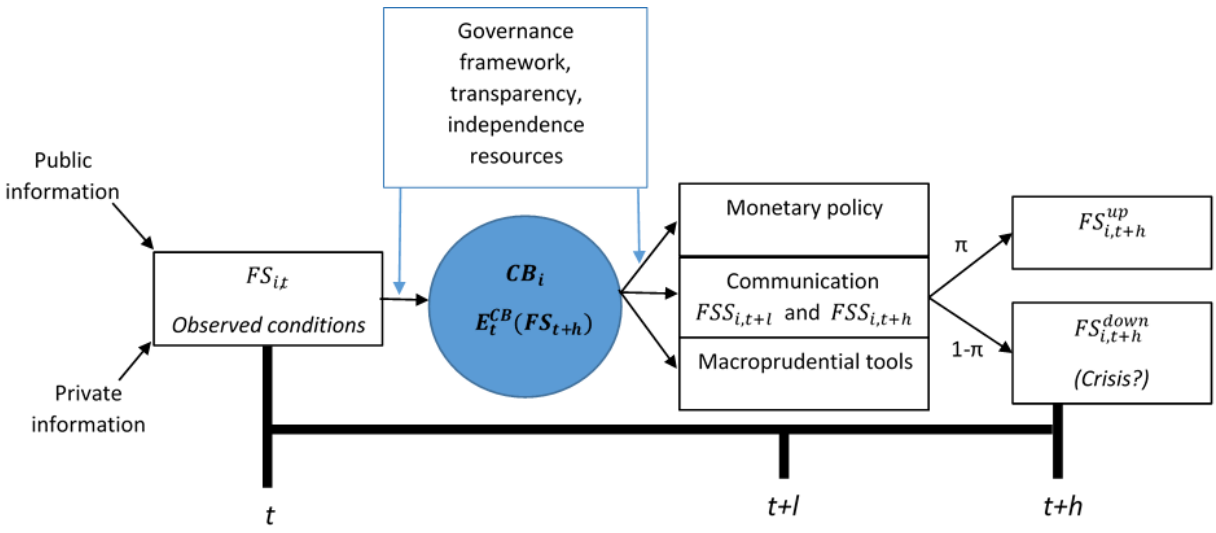
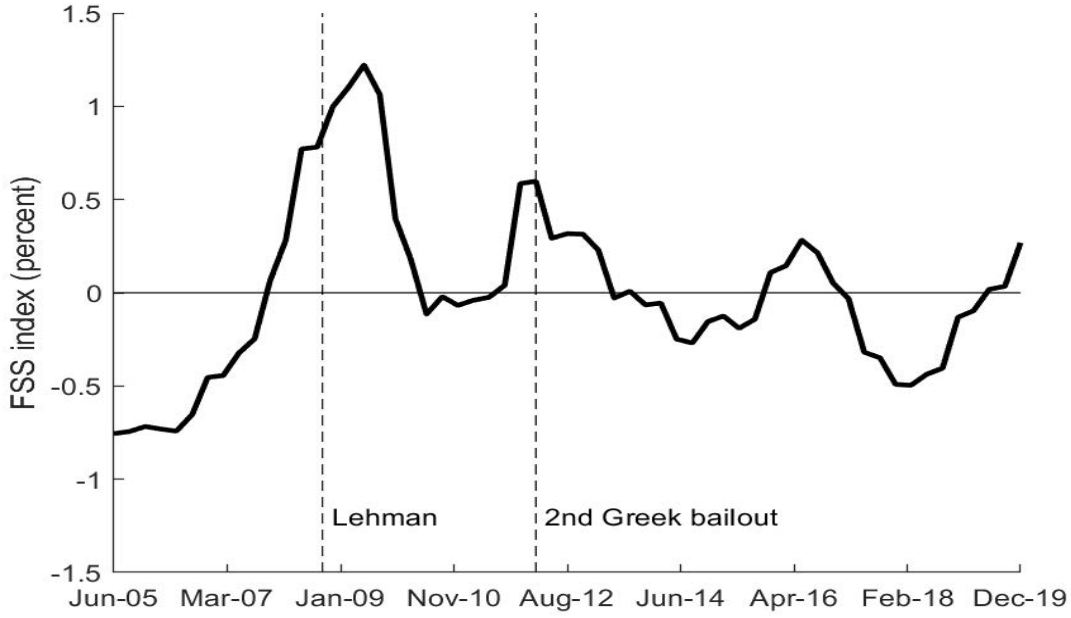
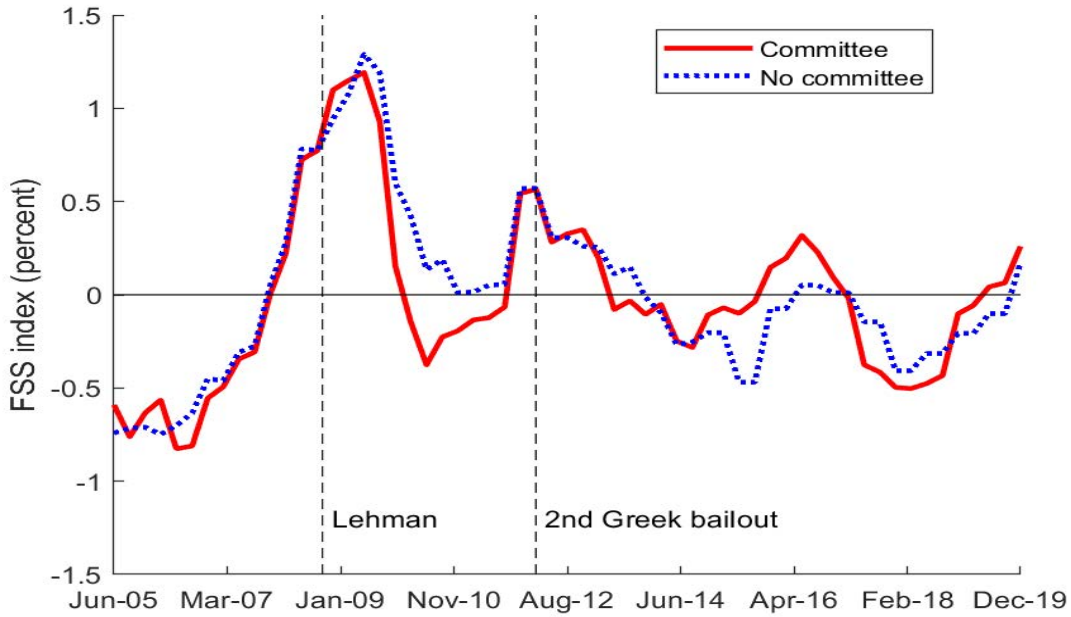


Figure 1: Central bank communication and financial stability governance

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

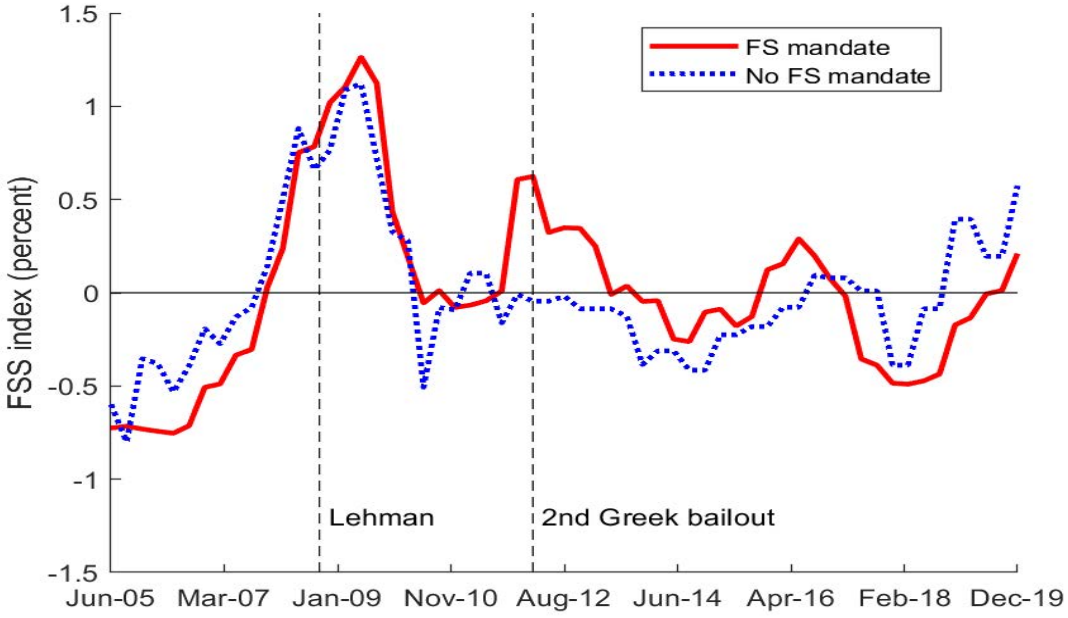


(a) A. All Countries

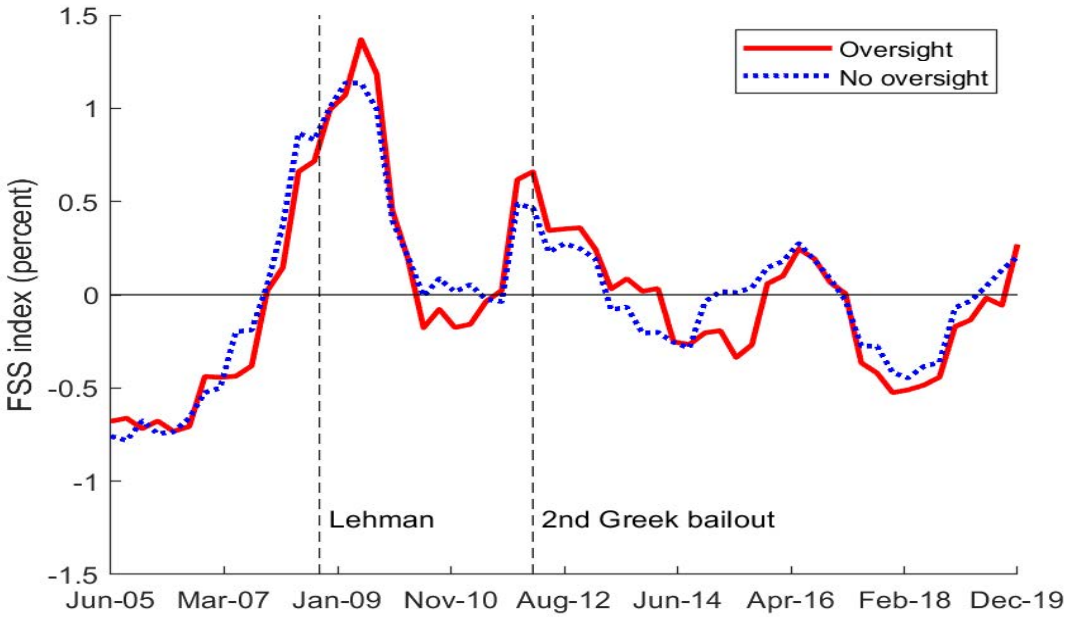


(b) B. Interagency financial stability committee

Figure 2: FSS indexes, averages across countries with certain 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).

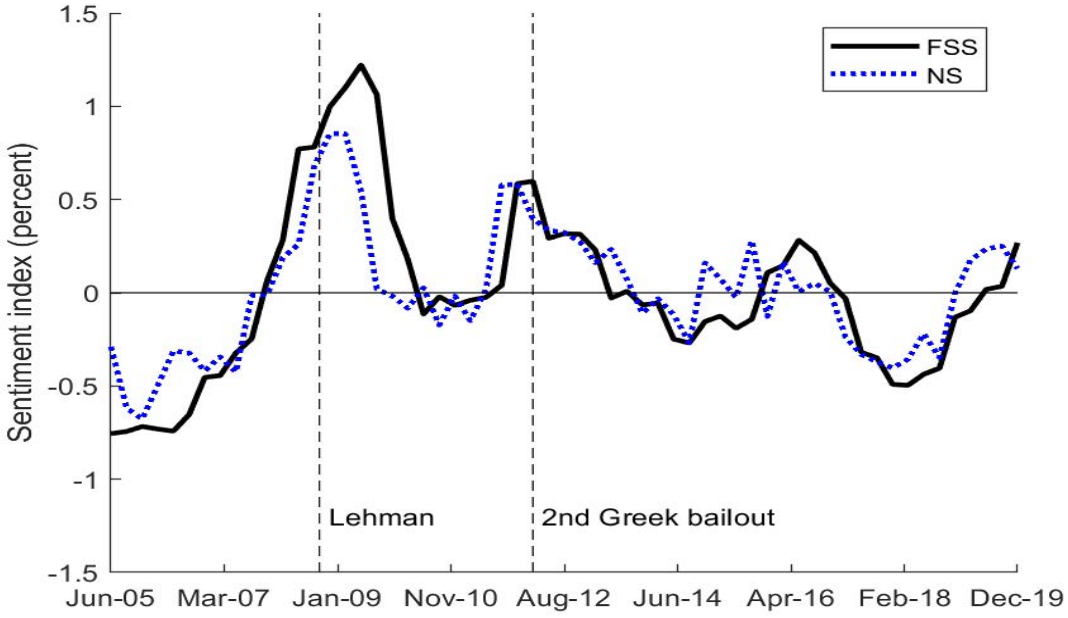


(a) C. Financial stability mandate

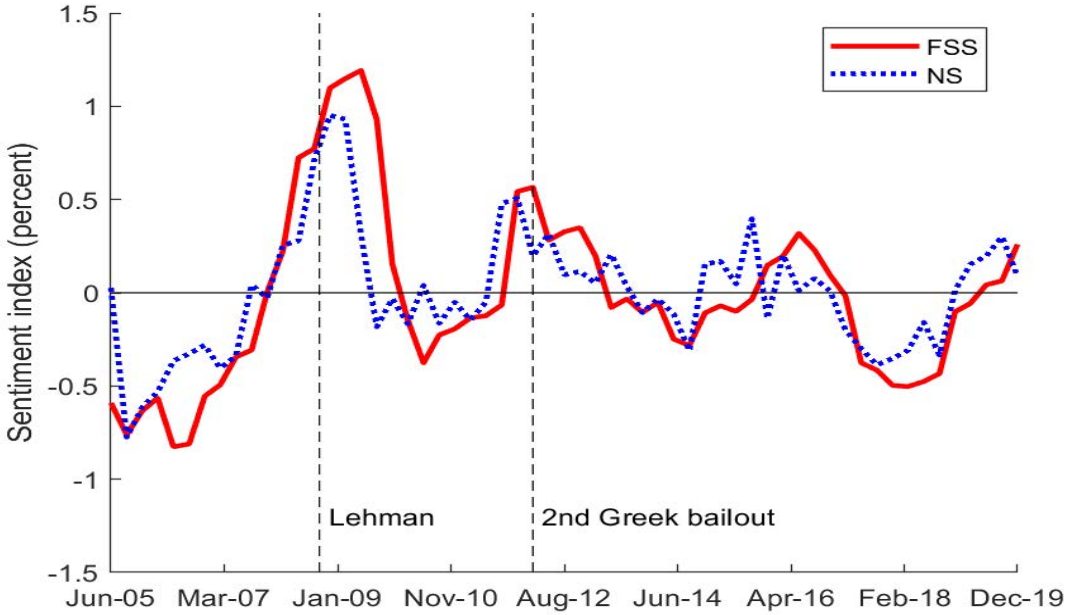


(b) D. Oversight role

Figure 2: FSS indexes, averages across countries with certain governance frameworks, continued



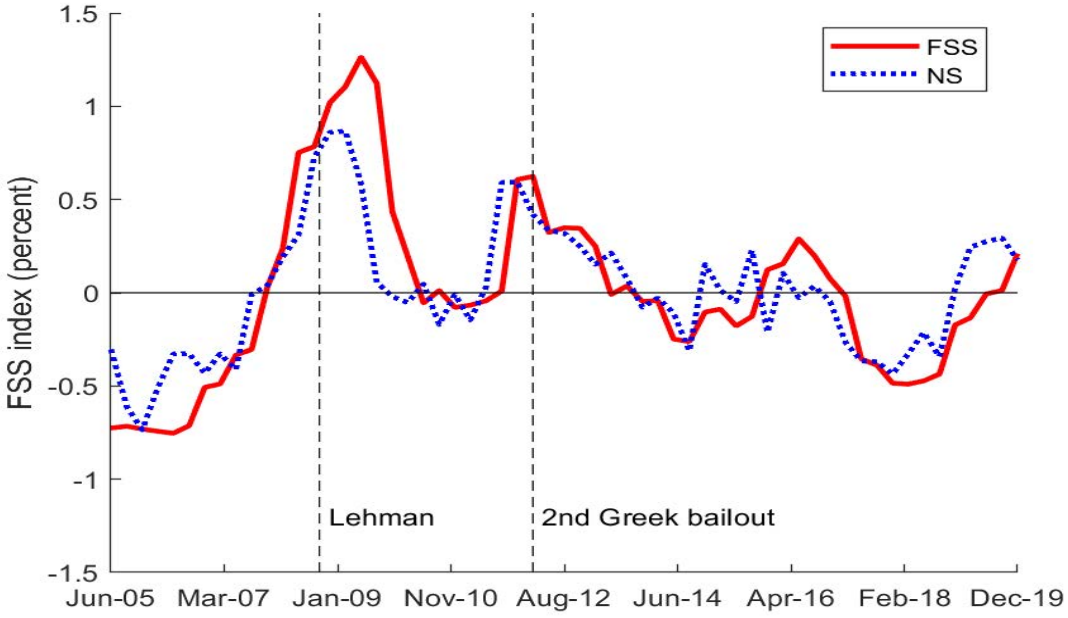
(a) A. All Countries



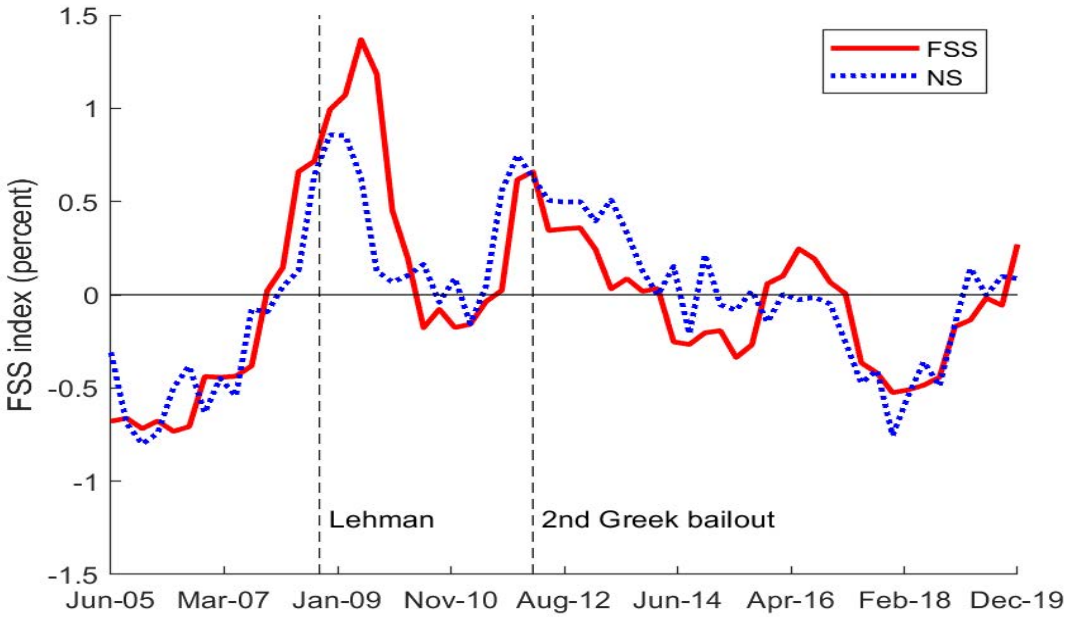
(b) B. Interagency financial stability committee

Figure 3: FSS versus NS indexes, averages across countries with certain governance frameworks

Panel A of this figure compares the sentiment from financial stability reports with that obtained from news articles. These indexes are calculated as the proportion of negative to positive words in either financial stability reports (FSS) or financial stability news articles (NS). The time series shown are equally-weighted averages of all countries' demeaned sentiment indexes. Panel B shows the average across all countries for which the central bank participates in an interagency financial stability committee. Panel C shows the average across all countries for which the central bank has a financial stability mandate. Panel D shows the average across all countries for which the central bank has 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 3: FSS versus NS indexes, averages across countries with certain governance frameworks, continued

Internet appendix of "Financial Stability Governance and Central Bank Communications"

Table A.1: Governance frameworks and heterogeneous effects of FSS for financial cycle indicators, robustness to alternative FSS indexes

This table reports the results for the panel-data regression setting in table 6:

$$FS_{i,t+4} = \alpha_i + \alpha + (\beta_1 + \beta_2 D_{i,t-1}) FSS^*_{i,t} + \gamma FS_{i,t} + e_{i,t+4},$$

where $FSS^*_{i,t}$ is an alternative FSS index. We consider two alternative measures of the index, the negativity index, in panel A, which is calculated as the proportion of negative to total words in FSRs, and the summary index, in panel B, which is calculated using only the text in the summaries of 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.

A. FSS negativity

	CGDP gap			Credit growth			Debt service ratio		
	Committee	Financial stability mandate	Oversight	Committee	Financial stability mandate	Oversight	Committee	Financial stability mandate	Oversight
AR coefficient	0.91***	0.92***	0.92***	0.19*	0.21*	0.20*	0.79***	0.79***	0.77***
	(0.04)	(0.04)	(0.05)	(0.08)	(0.08)	(0.08)	(0.09)	(0.08)	(0.08)
Constant	2.13	1.95	1.90	3.27***	3.14**	3.02***	4.17**	4.09**	4.56***
	(1.07)	(1.21)	(1.22)	(0.68)	(1.00)	(0.76)	(1.15)	(1.11)	(1.06)
FSS negativity (β_1)	-0.53	-1.54	-0.92	-0.28	-3.09	-0.35	-0.14	0.25	-0.09
	(0.48)	(2.52)	(0.52)	(0.29)	(4.32)	(0.33)	(0.15)	(0.38)	(0.15)
D*FSS (β_2)	-1.03**	0.61	-0.07	-0.81**	2.64	-0.51	-0.16*	-0.46	-0.34
	(0.32)	(2.56)	(0.41)	(0.28)	(4.32)	(0.48)	(0.07)	(0.36)	(0.18)
$\beta_1 + \beta_2$	-1.57**	-0.93	-0.99	-1.09**	-0.45	-0.86	-0.29	-0.21	-0.44
	(0.52)	(0.53)	(0.61)	(0.34)	(0.28)	(0.46)	(0.16)	(0.15)	(0.21)
R^2	0.80	0.79	0.79	0.08	0.06	0.06	0.56	0.55	0.56
N	1,301	1,301	1,301	1,230	1,230	1,230	981	981	981

B. FSS for summaries

AR coefficient	0.89***	0.90***	0.90***	0.19*	0.20*	0.20*	0.83***	0.83***	0.83***
	(0.05)	(0.05)	(0.05)	(0.08)	(0.09)	(0.08)	(0.06)	(0.06)	(0.06)
Constant	0.16	0.07	0.06	1.77***	1.68***	1.67***	3.22**	3.01**	3.30**
	(0.21)	(0.25)	(0.25)	(0.19)	(0.20)	(0.21)	(0.93)	(0.93)	(0.91)
FSS summary (β_1)	0.23	-0.75	-0.05	0.24	-1.27	0.09	0.02	0.00	0.02
	(0.26)	(0.52)	(0.26)	(0.17)	(0.96)	(0.22)	(0.09)	(0.04)	(0.09)
D*FSS (β_2)	-0.83**	0.64	-0.17	-0.66**	1.27	-0.3	-0.15**	-0.06	-0.22
	(0.24)	(0.57)	(0.23)	(0.20)	(0.97)	(0.26)	(0.05)	(0.06)	(0.12)
$\beta_1 + \beta_2$	-0.60*	-0.11	-0.23	-0.42*	0.00	-0.21	-0.13	-0.06	-0.21
	(0.25)	(0.25)	(0.29)	(0.17)	(0.15)	(0.17)	(0.08)	(0.08)	(0.11)
R^2	0.78	0.78	0.78	0.07	0.06	0.05	0.64	0.63	0.64
N	1,210	1,210	1,210	1,142	1,142	1,142	887	887	887

Table A.2: Governance frameworks and the heterogeneous predictive power of FSS for turning points in the financial cycle, alternative FSS indexes

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 $X_{i,t}$ contains one of the following alternative (demeaned) financial stability sentiment index measures: the negativity index, in panel A, which is calculated as the proportion of negative to total words in FSRs, and the summary index, in panel B, which is calculated using only the text in the summaries of 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.

Panel A. FSS negativity

	Committee		Official commitee		Committee with powers		Financial stability mandate		Oversight	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Constant	-1.44***	-1.47***	-1.55***	-1.44***	-1.63***	-1.46***	-1.47***	-1.30***	-1.56***	-1.38***
	(0.07)	(0.07)	(0.12)	(0.05)	(0.29)	(0.05)	(0.05)	(0.05)	(0.09)	(0.05)
FSS negativity	0.08	0.24*	-0.19	0.24**	-0.97**	0.20*	0.16	0.46	-0.13	0.31***
	(0.13)	(0.12)	(0.18)	(0.09)	(0.35)	(0.09)	(0.10)	(0.29)	(0.17)	(0.07)
R^2	0.00	0.01	0.01	0.01	0.09	0.01	0.01	0.01	0.00	0.02
N	672	659	410	921	80	1,251	1,190	141	671	660

Panel B. FSS summary

Constant	-1.44***	-1.50***	-1.53***	-1.45***	-1.74***	-1.48***	-1.49***	-1.26***	-1.61***	-1.39***
	(0.08)	(0.07)	(0.13)	(0.05)	(0.35)	(0.05)	(0.05)	(0.07)	(0.10)	(0.05)
FSS summary	0.06	0.14***	0.02	0.13***	-0.43***	0.13***	0.10*	0.14	-0.01	0.19***
	(0.07)	(0.04)	(0.12)	(0.03)	(0.05)	(0.03)	(0.05)	(0.15)	(0.08)	(0.04)
R^2	0.00	0.03	0.00	0.02	0.13	0.02	0.01	0.01	0.00	0.04
N	629	607	367	869	80	1,156	1,143	93	576	660

Table A.3: Governance frameworks and the heterogeneous predictive power of FSS for turning points in the financial cycle, adding control variables

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 $X_{i,t}$ contains the demeaned financial stability sentiment index calculated using the text in FSRs, $FSS_{i,t}$, the credit-to-GDP gap, and the debt service ratio. 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		Official commitee		Committee with powers		Financial stability mandate		Oversight	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Constant	-1.25***	-1.67***	-0.80***	-1.60***	-2.11***	-1.47***	-1.55***	-1.05***	-1.67***	-1.22***
	(0.13)	(0.16)	(0.20)	(0.18)	(0.38)	(0.05)	(0.12)	(0.06)	(0.20)	(0.09)
FSS	0.17***	0.25**	-0.09	0.24***	-1.49***	0.24***	0.21***	0.13***	0.18	0.25***
	(0.05)	(0.08)	(0.13)	(0.06)	(0.12)	(0.06)	(0.05)	(0.02)	(0.12)	(0.06)
CGDP Gap	0.03***	0.02**	0.03***	0.02***			0.02***	0.08**	0.03**	0.02***
	(0.01)	(0.01)	(0.01)	(0.01)			(0.00)	(0.03)	(0.01)	(0.00)
DSR	-0.03**	0.01	-0.07***	0.00			-0.01	-0.05***	-0.01	-0.02**
	(0.01)	(0.01)	(0.01)	(0.01)			(0.01)	(0.02)	(0.02)	(0.01)
R^2	0.08	0.07	0.18	0.06	0.24	0.02	0.08	0.08	0.09	0.05
N	547	447	285	709	80	1,251	902	92	427	567

Table A.4: Governance frameworks and communication strategies around crises

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

$$FSS_{i,t+1} = \alpha_i + \alpha + (\beta_1 + \beta_2 D_{i,t-1} + \beta_3 TP_{i,t+4} + \beta_4 D_{i,t-1} TP_{i,t+4}) X_{i,t} + \gamma FSS_{i,t-3} + e_{i,t+1},$$

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, $TP_{i,t}$ 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 $X_{i,t}$ is each one of the financial cycle characteristics. We report the results for two financial stability 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.

	CGDP Gap	Log of CGDP	Credit growth	DSR	SRISK to GDP	Bank CDS	Bank volatility	Log of prop. price	Log of hshold credit	Macro prudential measures	Monetary policy rate
AR coefficient	0.21***	0.24***	0.24***	0.23***	0.19***	0.23***	0.21***	0.23***	0.24***	0.25***	0.30***
	(0.04)	(0.04)	(0.04)	(0.05)	(0.05)	(0.05)	(0.04)	(0.04)	(0.04)	(0.04)	(0.05)
Constant	0.90***	-0.69	0.85***	-0.51	0.70***	0.75***	0.26***	1.16	-0.42	0.97***	0.57***
	(0.04)	(1.45)	(0.05)	(0.48)	(0.07)	(0.07)	(0.06)	(1.14)	(1.14)	(0.05)	(0.12)
RHS variable (β_1)	0.02***	0.35	0.03***	0.10**	0.08***	0.16	0.03***	-0.02	0.37	-0.03	0.10***
	(0.00)	(0.31)	(0.01)	(0.03)	(0.02)	(0.10)	(0.00)	(0.25)	(0.30)	(0.03)	(0.02)
D*RHS (β_2)	-0.01	-0.05*	-0.02	-0.02*	-0.01	0.01	0	-0.05	-0.07*	0	-0.02
	(0.01)	(0.02)	(0.02)	(0.01)	(0.02)	(0.07)	(0.00)	(0.02)	(0.03)	(0.03)	(0.02)
TP*FSS (β_3)	0	0.05	0.02	0	0.01	-0.01	0.01	0.06*	0.05	0.01	0
	(0.01)	(0.03)	(0.01)	(0.01)	(0.02)	(0.04)	(0.01)	(0.03)	(0.03)	(0.02)	(0.02)
D*TP*FSS (β_4)	0	-0.01	-0.01	0.01	0.03	0.03	0	-0.02	0	0.02	0
	(0.01)	(0.03)	(0.01)	(0.01)	(0.03)	(0.07)	(0.01)	(0.03)	(0.04)	(0.03)	(0.03)
$\beta_1 + \beta_3$	0.01	0.40	0.03**	0.10**	0.05*	0.13	0.03***	0.05	0.42	0.02	0.18***
	(0.01)	(0.30)	(0.01)	(0.03)	(0.03)	(0.07)	(0.00)	(0.25)	(0.29)	(0.03)	(0.03)
$\beta_2 + \beta_4$	0	-0.06	-0.01	-0.01	0.06**	0.06	0.02**	-0.08*	-0.07	-0.02	-0.10*
	(0.01)	(0.03)	(0.02)	(0.01)	(0.02)	(0.08)	(0.01)	(0.03)	(0.04)	(0.04)	(0.04)
R^2	0.11	0.09	0.11	0.15	0.13	0.12	0.24	0.08	0.09	0.08	0.12
N	1,329	1,331	1,308	998	1,219	921	1,283	1,223	1,322	995	1,178