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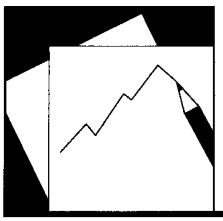

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Financial Stability Reports: What Are They Good For?

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Financial Stability Reports: What Are They Good For?

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Abstract

The global financial crisis has renewed policymakers' interest in improving the policy framework for financial stability, and an open question is to what extent and in what form should financial stability reports be part of it. We examine the recent experience with central banks' financial stability reports, and find—despite some progress in recent years—that forward-looking perspective and analysis of financial interconnectedness are often lacking. We also find that higher-quality reports tend to be associated with more stable financial environments. However, there is only a weak empirical link between financial stability report publication per se and financial stability. This suggests room for improvement in terms of the quality of financial stability reports.

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[1] The paper benefited from comments by Dimitri Demekas, Li Lian Ong, Francesco Columba, Jacek Osiński, Christopher Towe, and other IMF colleagues, as well as staff of several central banks that publish financial stability reports. Shakira Teh Sharifuddin was a summer intern in IMF's Monetary and Capital Markets Department when this study was prepared. Rabi Mishra and colleagues from the Reserve Bank of India provided useful information for Box 1. Any remaining errors are ours.

Contents Page

I. INTRODUCTION

The global financial crisis has renewed policymakers' interest in developing and improving tools to promote financial stability. The need for a macroprudential policy framework to address the stability of the financial system is now well recognized and is widely seen as an appropriate policy response to changes in the global financial environment. Even if there is consensus on the definition of macroprudential policy, incorporating macroprudential considerations in the current framework for financial stability poses operational challenges. Developing an operational macroprudential policy toolkit is the next step and a wide range of instruments, tools, and devices are being considered as possible components of the toolkit.[2]

In this context, the current financial stability framework includes financial stability reports (FSRs), issued by central banks in many countries around the world,[3] with the aim of limiting financial instability by pointing out key risks and vulnerabilities to policy makers, market participants, and the public at large. As of 2011, around 80 central banks are issuing FSRs.

Reviews of the experience with FSRs have been mixed. The early cross-country studies on the subject (Čihák, 2006; Oosterloo, de Haan, and Jong-A-Pin, 2007) find no clear relationship between FSR publication and financial stability. However, Born and others (2011) find that FSR communication reduces market volatility. Čihák (2006) also points out numerous areas for improvement in FSRs around the world.

This paper aims to extract lessons from the global financial crisis for the role of FSRs as a tool for the monitoring of financial stability and hence an effective device for a macroprudential policy toolkit. It provides in-depth information and analytical results, with a particular focus on the more recent experience of the global financial crisis and its immediate aftermath, starting from the criteria established by Čihák (2006) for assessing and comparing FSRs.

Our analysis suggests that the FSRs, despite some improvements in recent years, still tend to leave much to be desired in terms of their clarity, coverage of key risks, and consistency over time. A major drawback of a number of FSRs is the lack of 'forward-lookingness' of the reports (that is, insufficient analysis of risks and vulnerabilities), making them less capable of assessing systemic risk. Empirically, we find little evidence of a direct link between FSR publication and financial stability, but higher-quality FSRs seem to be associated with stable financial environments.

[2] IMF Executive Board paper (2011), "Macroprudential Policy Objectives and Tools: Lessons from Country Experiences."

[3] Throughout this paper, the term "country" includes also some territorial entities, which are not countries, but for which separate economic statistics are produced.

The structure of the remainder of the paper is as follows. Section II summarizes the general trends in reporting on financial stability. Section III discusses what one could expect from a financial stability report and presents eight case studies. The section examines in more depth how well FSRs in a particular country have captured or failed to capture relevant financial stability. Section IV examines econometrically the link between the key features of individual financial stability reports and cross-country differences in financial instability during the global financial crisis. It uses a broad international sample, controlling for other financial and economic factors affecting financial stability. Section V concludes.

II. Trends in Reporting on Financial Stability

Between 1996 and 2005, publishing of FSRs became a rapidly growing "industry", with the number of central banks issuing such reports increasing worldwide from 1 to about 50 (Čihák, 2006). Since 2005, this number has grown somewhat less rapidly, although it has kept increasing and now reached about 80 (Figure 1).[4]

Interestingly, in a departure from the growth period in the late 1990s and early 2000s, several countries have recently phased out FSRs. For example, in Ireland, an economy hit very hard by the global financial crisis, the central bank halted publication of its FSR (available for years 2004–07) in 2008. Israel's central bank stopped issuing the FSR as a stand-alone publication in 2005, covering financial stability issues to some extent in *Israel's Banking System—Annual Survey*, and Banque de France stopped publishing its FSR in 2007, producing a financial risk assessment only for internal consumption.[5]

The recent 'entrants' into the FSR market include some of the world's largest economies. For instance, India's central bank, the Reserve Bank of India, started publishing FSRs in 2010, and the United States, which stayed out of the FSR-publishing trend for many years, started publishing an FSR in 2011 (see Box 1 for a discussion of U.S. and India's FSRs). Interestingly, the U.S. report is published by the recently created Financial Stability Oversight Council (FSOC).[6] The U.S. central bank (Federal Reserve) is represented in this body, but—unlike virtually all of the other FSRs in our sample—it is not the sole publisher of the FSR. Along similar lines, Mexico's Council for the Stability of the Financial System (CESF) has also

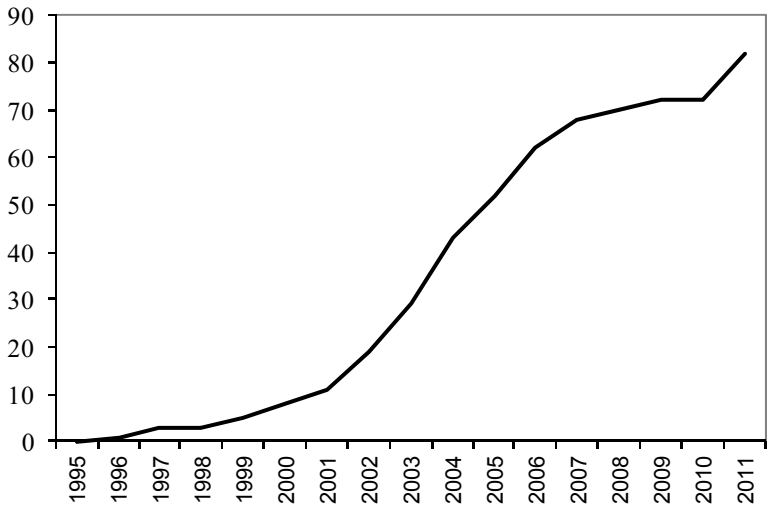
[4] Appendix I has a summary table of FSRs published around the world as of November 2011. Note that the 2011 total is an estimate, due to the publication lags. To arrive at the estimate, we have taken into account the FSRs that have been newly issued in 2011, and assumed that all central banks that have published FSRs in previous years will also publish one in 2011.

[5] Banque de France's website contains a *Financial Stability Review,* but that is a collection of articles or conference materials on a featured topic rather than a regular report presenting or updating the central bank's assessment of financial stability in France.

[6] For the report, see http://www.treasury.gov/initiatives/fsoc/Pages/annual-report.aspx. For a testimony on the preparation of the report and its place in FSOC's work, see http://www.federalreserve.gov/newsevents/testimony/liang20110414a.htm.

published its reviews and assessments on financial stability.[7] It remains to be seen to what extent a similar approach will be taken in other countries and regions around the world.[8] One can argue that a financial stability council can have a key role in implementing policy actions following a financial stability assessment, when macro-prudential instruments lie in the competences of different institutions.

Figure 1. Number of Countries Publishing FSRs, 1995–2011



Source: Author's calculations, based on information available from individual central banks. The 2011 number is the authors' estimate, assuming that all central banks that have published FSRs in previous years will publish also a 2011 FSR.

[7] The CESF is an organization created by Mexico in 2010 that groups together the supervising and regulating authorities of the country's financial system. The council's aim is to analyze and identify risks that may hamper the functioning of the financial system and thereby reduce their impact on Mexican economy and heritage. (http://en.presidencia.gob.mx/the-blog/stability-of-mexican-financial-system-in-uncertain-global-environment/#more-66353)

[8] In the European Union (EU), the European Systemic Risk Board (ESRB) created in 2010 is an independent body responsible for the macro-prudential oversight of the financial system within the EU (http://www.esrb.europa.eu/home/html/index.en.html). ESRB's secretariat is ensured by the European Central Bank, which publishes an FSR. The ESRB has not been publishing its own FSR.

Box 1. Recent Entrants into the FSR 'Industry': United States and India[1]

United States. The United States, which stayed out of the FSR-publishing trend for many years, started issuing an FSR in 2011. The report is published by the recently created Financial Stability Oversight Council (FSOC), created under the Dodd-Frank Wall Street Reform and Consumer Protection Act (Dodd-Frank Act), with responsibilities that include identifying and mitigating risks to the stability of the US financial system. Under the law, the FSOC is required to publish its annual report to report on major financial and regulatory developments, potential risks to the financial system, and recommendations to mitigate potential risks. The FSOC's first annual report was released (together with selected data used in the report) on July 26.

An interesting feature of the U.S. FSR that a significant part of the publication is governed directly by law. The Dodd-Frank Act not only requires the FSOC to produce the annual report, but it also outlines what the report needs to address (e.g., the activities of the Council, significant financial market and regulatory developments, potential emerging threats to the financial stability of the United States, and recommendations to promote market discipline, maintain investor confidence, and to enhance the integrity, efficiency, competitiveness, and stability of United States financial markets). The release of the annual report requires the approval by the voting members of the FSOC. Moreover the release of the annual report is also formalized in that the chair of the council has to appear before Congress, specifically, the Financial Services Committee to deliver the report.

Following the release of the 2011 report, the bulk of the discussions by the readers centered on the threats to financial stability as well as recommendations laid out in the report. At more than 160 pages, some observers viewed the report as rather long and wanted more clarity on how severe are the various risks identified in the report; others commented on the lack of forward-looking analysis. Nonetheless, many observers saw the report as a good first step—or, as one observer put it, "not a bad first stab at creating a record of the US government's financial worry list."[2]

India. Another recent major entrant into the FSR 'industry' is the Reserve Bank of India (RBI), which started publishing FSRs in 2010. India's FSR aims to leapfrog by adopting relatively advanced methodologies, mentioned below. Its approach to systemic risk regulation is also interesting due to its combination of regulators, treasury, the central bank, and political representatives.

The origins of the FSR can be traced back to the Committee for Financial Sector Assessment, set up in 2006 to conduct a comprehensive self-assessment of India's financial sector. In 2009, it recommended that a multi-disciplinary unit—the Financial Stability Unit—be set up within the RBI with a remit to, inter alia, publish periodic FSRs (http://rbidocs.rbi.org.in/rdocs/PublicationReport/Pdfs/CFSA1.pdf). The purpose of these reports was then spelled out in the first FSR of March 2010, stating that the FSR "is an attempt at institutionalizing the implicit focus [of the RBI on financial stability] and making financial stability an integral driver of the policy framework. … It is hoped that FSRs will emerge as one of the key instruments for directing pre-emptive policy responses to incipient risks in the financial system "(http://www.rbi.org.in/scripts/BS_PressReleaseDisplay.aspx?prid=22230).

The highest-level institutional body for financial stability in India is the *Financial Stability and Development Council* (FSDC). The Council is chaired by the Finance Minister, with members including the Governor of the RBI, the Finance Secretary and other Ministry of Finance officials, and heads of other sectoral regulators. The Council is assisted by a *Sub-Committee*, chaired by the RBI Governor. All the other members of the Council, except for the Finance Minister, are also members of the Sub Committee. RBI's Deputy Governors are also represented in the Sub Committee. The Sub Committee, in turn, is assisted by two technical groups—a Technical Group for Financial Inclusion and Literacy and an Inter regulatory Technical Group.

Box 1. Recent Entrants into the FSR 'Industry': United States and India (continued)

The mandate of the Council and of the Sub-Committee includes issues related to financial stability, financial sector development, macroprudential supervision of the economy, including monitoring of financial conglomerates, inter-regulatory coordination, financial inclusion, and financial literacy. The Sub-Committee members contribute to the assessment of systemic risks, including the assessment disseminated through periodic FSRs produced by the RBI. These reports are discussed in the Sub-Committee before their publication.

The RBI has set up Financial Stability Unit with a mandate that includes conducting macro-prudential surveillance of the financial system on an ongoing basis to enable early detection of any incipient signs of instability. In addition to the semi-annual FSRs (which the RBI sees as a critical tool in its attempt to communicate the potential systemic risks facing the financial system to all stakeholders), the Unit also produces quarterly Systemic Risk Monitors (which are placed before the RBI's senior management, but are not published) and monthly monitors (which track developments in the financial markets with a view to identifying systemic risks as they emerge; these are also not published).

The systemic risk assessment is supported by financial stability analytics including stress tests to assess the resilience of the financial sector. Indicators to assess the health and resilience of the financial system include: a Banking Stability Indicator (to monitor the riskiness of the banking system); a Financial Stress Indicator (a contemporaneous indicator of conditions in the equity, foreign exchange and interest rate markets and in the banking sector); an agent-based network model of bilateral exposures among various entities of the financial system (to assess interconnectedness in the system and analyze the possible contagion impact of idiosyncratic failures); a series of Banking Stability Measures (to assess the systemic importance of individual banks); and a vector auto regression approach (to assess the impact of macroeconomic shocks on the stability of the banking system). India's systemic risk monitoring framework is designed to be forward looking. This includes assessing future impacts by projecting a set of indicators and institutions' balance sheet items. The impact of macroeconomic shocks on bank's credit quality is estimated using a combination of models including multivariate regressions, logit regressions, panel regressions, and vector autoregressions. This helps to assess the impact of macroeconomic variables on systemic risk via different but complementary angles.

The assessment and communication of these risks through periodic FSRs is a result of a process of consultations within the RBI and with other entities in the financial sector.

- RBI's Inter-departmental Coordination Committee on Assessment of Financial Stability meets quarterly to brainstorm on potential systemic risks from different segments of the economy;
- Semi-annual meetings are convened with the key market players (chief economists/heads of risk of select commercial banks, rating agencies, non-banking financial institutions, etc.) to obtain feedback in respect of market perceptions of the risks to the financial system. Beginning October 2011, Systemic Risk Surveys are being conducted to elicit structured feedback from a larger number of market players in this respect.
- Issues related to financial stability form an important segment of the meetings of the Sub-Committee (held quarterly). Continuous feedback from other financial sector regulators is also obtained through the aforesaid Inter-Regulatory Technical Group.

[1]The text on India benefited from inputs by the Financial Stability Unit, RBI, Central Office, Mumbai.

[2] Sources: "A Year in Financial Instability," by John McDermott (www.ft.com/alphaville, on July 28, 2011); "Self-Serving and Conflicted – FSOC Annual As Forthcoming As Expected" by Jim Allen, CFA Institute (http://blogs.cfainstitute.org), "Shelby Slams FSOC, Questions Chances of Success" by John Sullivan, AdvisorOne (www.advisorone.com).

When examining this global sample of FSRs over the 15 years, the general features of the publication, such as frequency of publication, length, and structure, have not changed dramatically. As regards frequency, there were some changes in individual countries (for example, Latvia switched from semi-annual to annual FSRs in 2007, while Portugal and Slovakia increased the frequency of FSRs from annual to semi-annual), but the overall composition of FSRs in terms of their frequency (semi-annual: annual) has remained unchanged at about 3:1. Similarly, the average length of an FSR has declined somewhat, but only marginally.[9]

To some extent, this lack of clear global trends disguises important changes at the individual country level. In particular, as individual countries gained more experience with FSR publication, they have beefed up the contents of the FSR and started providing underlying data and other useful information relating to the FSR. Indeed, some of the central banks that have been publishing FSRs since the mid-1990s are also the leaders in terms of the forward-looking nature of the report, and the transparency of the report (see Box 2, for a discussion of the Swedish FSR).

Another common trend, when examining the FSRs issued by the same central bank over a number of years, is that the coverage of issues in FSRs tends to increase over time, reflecting perhaps the increasing capacity of the central banks to compile and analyze the relevant data. Most FSRs started as very narrowly focused, typically on the banking sector, and over time evolved into more general reports, covering also nonbank financial institutions, the financial soundness of counterparties (households, non-financial firms), the payment and securities settlement systems, and the regulatory framework.

The examination of the FSRs over time also suggests the following:

- the use of more sophisticated market-based indicators has been increasing. For example, recent FSRs have used market-based indicators, such as credit-default swaps, stock market indices, and distance-to-default indicators;
- the share of FSRs using stress testing has grown from zero to more than half of the published FSRs;
- more FSRs present results of their early warning systems;
- the calculations are more frequently based on disaggregated data;
- attempts are being made to integrate FSRs better with other policy work by central banks, such as monetary policy studies and models; and
- recent FSRs are also more likely to include a discussion of the regulatory framework or a (self-) assessment of compliance with the regulatory standards.

[9] The average length of an FSR in 2009 was 92 pages, as compared to, for example, 101 pages on average in 1999. However, considering the substantial cross-country standard deviation in length (52 pages), this change is not statistically significant.

Another important trend has been the increasing availability of the underlying data for FSRs. Central banks willing to share (some of) the underlying data face a trade-off. On the one hand, including more numerical information in an FSR would make it more useful to an analytically-minded user. On the other hand, it would make the report too long and cluttered with too much information so that the key messages may get lost. A solution adopted by some FSR publishing countries is to provide the key underlying data separately, either in a separate statistical appendix or in a spreadsheet, for example in Excel format. Posting the data increases dramatically the usefulness of the FSR to its users, especially if it is clear how the data are being used in the FSR. Presenting the data separately limits the risk that the main message of the FSR would get drowned in the volume of information. Such statistical appendices or spreadsheets have so far been used only by a minority of the FSR-publishing central banks, but the share increases with the number of years, i.e. the longer a central bank has been publishing an FSR, the more likely it is to publish also the underlying data.

Several countries have revamped the format and presentation of their FSRs, one of the prominent examples being the Bank of England (BoE) FSR. In 2006, the BoE issued a revamped FSR, in which several elements were substantially shortened (e.g., the payment systems section) while new features were added (e.g., a clearer presentation of the linkages between overall assessment and the underlying analysis, a more in-depth analysis of household credit risks). Other recent changes included posting the underlying data (in a spreadsheet form) together with the FSR, providing the charts used in the reports also in Power Point format, and (since 2011) uploading the webcast of the press conference for the FSR's release and the conference's transcripts. Since February 2011, the FSR has been produced under the guidance of the (interim) Financial Policy Committee (FPC), a committee of the BoE in charge of macroprudential policy. The FSR covers the FPC’s assessment of the outlook for the stability and resilience of the financial sector and the policy actions it advises to reduce and mitigate risks to stability.

Finally, an important trend is that the FSRs are getting more formally anchored in countries’ legal frameworks. For example, in the recently started U.S. FSR, the law not only requires the production of the report, but it also outlines what the report needs to address, and it requires that the chair of the report-producing body has to appear before Congress to deliver the report. Similarly, in Korea, a recent revision of the central bank act states that the issuance of FSRs is a duty of the central bank, and starting from 2012, requires that the FSR be formally submitted to the National Assembly twice a year.

Box 2. Swedish Riksbank

Riksbank, the Swedish central bank, has been recognized as a very transparent central bank, at least in terms of the sheer amount of information made publicly available (e.g., JP Morgan, 2007). Also in the area of financial stability reporting, it was one of the first (alongside United Kingdom's Bank of England and Norway's Norgesbank) to publish its FSR in 1997. In the spirit of transparency, its FSRs are accompanied by extensive spreadsheets with underlying data and other useful information. Its FSRs also score rather well in terms of providing the basic 'metadata', such as Riksbank's mandate in the area of financial stabilty, the purpose of the financial stability reporting, and Riksbank's definition of financial stability.

Another notable element of Riksbank's FSR is that it has a rather substantial forward-looking element. While it contains an analysis of past developments (as any FSR), it also has a prominent chapter devoted specifically to 'future prospects, risks and stress tests' that feeds into the overall assessment. The report features extensive use of up-to-date market-based indicators, and provides a granular (bank-by-bank) presentation of stress test results for the major Swedish banks. Importantly, from 2010, it also includes a section in which the Riksbank presents its recommendations on what needs to be done (by banks and others) to address the identified risks to financial stability, and reviews what was done in response to its previous recommendations.

Riksbank's FSRs have been subject to a range of external evaluations. For example, Hallvarsson and Hallvarsson (2010), as part of a broader analysis of communication by the main actors in the Swedish financial system at the height of the global financial crisis, find that crisis communication by the main actors, including the Riksbank, worked well and helped avoid a more severe crisis. At the same time, they point out some disconnect in how the Riksbank's FSR communicated its concerns about growing risks associated with lending in the Baltic States while simultaneously stating that the Swedish financial system was stable. They make concrete suggestions on how to increase the impact of the Riksbank's FSRs, such as producing more concentrated reports at more frequent intervals; using simple communication tools such as barometers or risk zones so as to improve the transparency of financial stability diagnosis; introducing direct communications of specific concerns via public letters to the heads of the banks when deemed necessary; and finding methods to assess the degree of confidence of market participants.

Goodhart and Rochet (2011), in a report evaluating Riksbank's performance for the Swedish parliament, mention similar points, focusing in particular on liquidity risks, where they see Riksbank's analysis particularly deficient. In their view, the underlying issue is that the definition of stability used by the Riksbank at the height of the crisis did not cover liquidity and confidence problems, and they suggest broadening and clarifying Riksbank's mandate accordingly.

It should be noted that in the latest (2011:1) FSR, Riksbank is very open about the risks and shortcomings in the liquidity risk area. It highlights that Swedish banks present very little information on their liquidity risks, and calls on banks to 'improve their public reporting of their liquidity status.' It also recommends that the banks reduce their liquidity and financing risks.

III. Eight Case Studies of FSRs: How Did They Do During the Crisis?

Before examining econometrically the full worldwide sample of FSRs over a longer period of time, this section provides a closer look at what works in FSRs and what does not, based on a sub-sample of eight FSR-publishing countries during the global financial crisis, i.e., from 2008 to mid-2011. An in-depth "case study" analysis for the eight FSRs was carried out to assess to what extent the FSRs feature some of the good practices proposed in Čihák (2006). The countries—Brazil, Canada, Korea, Iceland, Latvia, New Zealand, South Africa, and Spain—were selected with a view to having a reasonably balanced coverage, both geographically and between advanced economies and emerging markets. Moreover, we have ensured that the sample includes countries that both felt the brunt of the global financial crisis and were relatively unaffected. For FSRs that are published semi-annually, we examine only one FSR; the one that at least covers part of the second half of a particular year and was published before June 2011.

A. What to Expect from a Financial Stability Report

This paper adopts the methodology introduced by Čihák (2006) for assessing financial stability reports. Fracasso, Genberg, and Wyplosz (2003) proposed a methodology for assessing central banks' inflation reports, and showed that the report 'quality' measured this way actually has some real-world impacts (in terms of inflation expectations and inflation outcomes). Using this approach as an inspiration, Čihák (2006), in the first worldwide survey of FSRs, introduced a similar methodology for assessing central banks' FSRs. The methodology can be summarized in a 5x3 matrix (Table 1). The methodology distinguishes five main elements of an FSR: (i) the report's aims, (ii) the overall assessment presented in the report, (iii) the issues that are covered, (iv) the data, assumptions, and tools that are being used, and (v) other features such as the report's structure. For each of the five elements, the methodology focuses on three key characteristics: clarity, consistency, and coverage (the 'CCC framework').

Table 1 presents the 'CCC framework', summarizing for each element (i.e., for each of the five rows in the matrix) and each characteristic (i.e., for each of the three columns in the matrix) some key criteria to be used by a person analyzing or assessing an FSR. Appendix II provides more detail on the 'good practices' put forth by Čihák (2006).[10] The percentages in parentheses can be used to aggregate the individual grades into an overall, composite grade. This is done in Section IV of the paper, which uses the FSR composite quality rating. The reason for creating the composite grade is that by examining the ranking for each criterion, one cannot conclude that a

[10] A possible approach to measuring a report's clarity is to calculate its Flesch-Kincaid grade level, a statistic based on textual characteristics of documents (number of words, sentences, and syllables) to approximate the years of education needed to sufficiently comprehend the text. The statistic looks purely at the stylistic elements of the text, not at what the text actually says. Since its introduction in the 1970s (Kincaid and others, 1975), it was used in a range of contexts, for example to examine the readability of commercial banks' annual reports (Clatworthy and Jones, 2001). We have calculated the statistic and found that it is rather stable over time for FSRs issued by the same institution. The main drawback of the statistic in our context, however, is that its value depends on whether a text was written in English or whether it was translated into English from another language. As a result, it is not suitable for the cross-country analysis in our paper.

particular FSR is better than another, but, by calculating an overall assessment or rating one can get a rough indication of the FSR's quality. Selecting such weights is never an exact science, but there is an underling reasoning. The weights are chosen so that they are distributed evenly across the three Cs, and approximately evenly across the five elements, with less weight on the 'other' elements, and ensuring that the weights add up to 100 percent. Sensitivity checks suggest that the overall grading and the associated results are rather robust with respect to changes in the individual weights.

One issue that is not explicitly highlighted in this matrix as a separate column or row, but that is quite relevant, is the extent to which an FSR is forward looking versus backward looking. From a report that communicates the central bank's assessment of financial stability, one could expect a forward-looking orientation. This should be reflected in a number of the report's elements. In particular, its overall assessment (row B) should include forward-looking statements about risks and vulnerabilities and its tools (row D) should include stress testing and other forward-looking techniques. To preview one of the findings of this paper, we find many FSRs focus on a description of past developments and are not sufficiently forward looking.

Table 1. FSRs: Clarity, Consistency, and Coverage

	Clarity	Consistency	Coverage
A. Aims	A1. The aims of the report should be clearly indicated (3 percent). A2. The definition of financial stability should be clearly indicated (3 percent).	A3.The definition of financial stability should be a standard part of the report, presented consistently across reports (3 percent). A4. The statement of aims should be a standard part of the report, presented consistently across reports (3 percent).	A5. The definition of financial stability should cover both the absence of a crisis and resilience to a crisis (3 percent). A6. Financial stability should be defined both in general terms and in operational terms (3 percent). A7. The aims of the report should be comprehensive (3 percent).
B. Overall assessment	B1. The overall assessment should be presented clearly and in candid terms (5 percent).	B2. The overall assessment should be linked to the remainder of the FSR (5 percent).	B3. There should be a clear link between the assessments over time, making it clear where the main changes took place (5 percent). B4. The overall assessment should cover the key topics (5 percent).
C. Issues	C1. The report should clearly identify the main macro-relevant stability issues (5 percent).	C2. The coverage of issues should be consistent across the reports (6 percent).	C3. The coverage of the financial system should be sufficiently comprehensive. FSRs typically cover the banking system in the greatest depth, but nonbank financial system and payment infrastructure issues are typically also covered. When some issues are not covered, the lack of coverage should be indicated and justified (6 percent).

D. Data, Assumptions, and Tools	D1. It should be clear what data are used to arrive at the results presented in the report (5 percent). D2. It should be clear what assumptions are being used to arrive at the results presented in the report (5 percent). D3. It should be clear what methodological tools are used to arrive at the results presented in the report (5 percent).	D4. The results should be presented in a consistent way across reports. (5 percent).	D5. The report should use available data, including those on individual institutions (5 percent). D6. The report should use the available tools (5 percent).
E. Structure and other features	E1. The structure of the report should be easy to follow (2 percent). E2. Other features of the report (e.g., its length, frequency, timing, public availability, and links to other central bank reports) should be designed to support its clarity (2 percent).	E3. The structure of the report should be consistent across time to make it easier to follow for repeat users (2 percent). E4. The other features of the report should be designed to support its consistency (2 percent).	E5. The structure of the report should allow coverage of the key topics (2 percent). E6. The other features of the report should be designed to support its coverage (2 percent).

Source: Čihák (2006), based loosely on Fracasso, Genberg, and Wyplosz (2003).

Notes: For a more detailed description and explanation of the CCC framework, see Appendix II. One of the possible uses of the framework is to grade FSRs' consistency with the proposed 'good practices.' The weights are chosen so that they are distributed evenly across the three Cs, and approximately evenly across the five elements, with less weight on the 'other' elements, and ensuring that the weights add up to 100 percent. Sensitivity checks suggest that the overall grading and the associated results are rather robust with respect to changes in the individual weights.

B. What Are the Objectives of FSRs?

We observe mixed approaches to including in the FSRs a definition of financial stability. FSRs for Canada, Iceland, Korea, and South Africa consistently indicate the central bank's definition on financial stability. These definitions are usually presented at the beginning of the report, either as part of the introduction or as a separate box in the inside cover of the introduction. In the Korea and South Africa FSRs, the definition of financial stability covers both the absence of a crisis and resilience to a crisis. In addition, South Africa's FSRs also included an operationalized

definition of financial instability. For the remaining four countries, we did not find an explicit definition of financial stability either in the FSR or on the central bank's website.

The aims of the reports are clearly indicated in most of the FSRs reviewed. We find that most FSRs state the report objectives clearly at the beginning of report, with the exception of Spain, which provides its FSR's objective on the central bank website.[11] However, we observe a significant variation with respect to the degree of comprehensiveness on the aims of the report. At the very least, most of the FSRs include the objective of identifying and analyzing risks to the financial system. A few FSRs, such as those of Canada and Iceland, also have the objective of providing information for major participants in the financial industry to evaluate and manage risks. FSRs for Canada and Iceland also include the objective of informing about the measures being taken to address the risks identified. In addition, the central banks in South Africa and Iceland aim to stimulate dialogue and discussion of financial stability issues through the publication of their FSRs.

Table 2. FSR Objectives

Brazil	Describes recent national financial system dynamics, presenting the conclusion of the analysis of its resilience to eventual shocks, as well as its evolution perspectives.
Canada	The FSR brings together the Bank's ongoing work in monitoring developments in the system with a view to identifying potential risks to its overall soundness, as well as highlighting the efforts of the Bank and other domestic and international regulatory authorities to mitigate those risks.
Iceland	i) To promote informed dialogue on financial stability, i.e. financial system's strengths and weaknesses, the macroeconomic and operational risks that it may face, and efforts to strengthen its resilience. ii) To provide an analysis that is useful for financial market participants in their own risk management. iii) To focus the Central Bank's work and contingency planning. iv) To explain how the Central Bank carries out the mandatory task assigned to it with respect to an effective and sound financial system.
Korea	As part of its macro-prudential policies, the FSR aims to identify and analyze systemic risks and suggest measures for mitigating these risks based upon this analysis.
Latvia	The FSR analyzes and evaluates the performance of the Latvian financial system, focusing on banking operations.
New Zealand	The Reserve Bank Act requires the report on the soundness and efficiency of the financial sector and the measures undertaken by RBNZ to achieve its statutory purposes. The FSR must contain the information necessary to allow an assessment of these activities.
South Africa	The FSR aims to identify and analyze potential risks to financial system stability, communicate such assessments and stimulate debate regarding pertinent issues.
Spain	Analyzes the evolution of the risk, solvency and profitability of deposit institutions.

Source: Central Banks' FSRs.

[11] Spain provided its objective in the first FSR in 2002, but not in subsequent FSRs including those in our case study. See Appendix IV for the sample of FSRs covered by this section.

C. Do FSRs Cover Key Systemic Risks?

Most FSRs in our sample demonstrate a fair degree of consistency in covering the key systemic risk factors. The analysis of these risk factors is typically based on discussions of the trends in certain financial indicators and ratios. Occasionally, results of sensitivity or scenario stress testing are also included in the discussion of the systemic risks. Some countries, such as Korea, took additional steps in making the coverage of risks in their FSRs more comprehensive by including detailed analysis of the risks that were specific to the domestic financial system, such as maturity mismatches and market risk from banks' trading activities (Table 3).

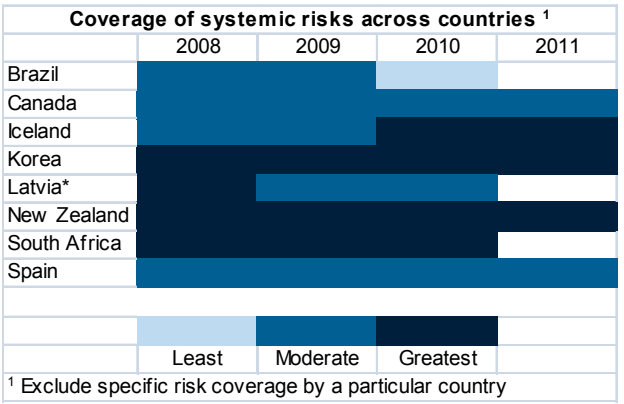
Analysis of non-bank financial institutions (NBFIs) is regularly featured in the FSRs. However, it could be better integrated with the banking sector discussion. The FSRs of the eight countries tend to report developments in the NBFIs at an aggregated level, rather than by each type of institution or by segment. Moreover, while the coverage of NBFIs is consistent, the FSRs generally fail to make any linkage between the NBFIs and the domestic financial system.

Some FSRs omit an analysis of certain systemic risks. The FSRs in our sample consistently feature an analysis of credit risk. However, in some cases, other risks, such as liquidity risk and market risk, are not included in a particular year or are not included at all in any of the FSRs reviewed. For example, in the case of the Spanish FSRs in our study sample an in-depth analysis of housing market developments and their impact was not observed. While there is a brief analysis of the declining trend of lending to real estate developers and to households for house purchases, we could not find a detailed discussion of housing price trends and their impacts.[12] Another example is Iceland's FSRs, in which we did not find a discussion of lending standards.

Most of the FSRs in our sample tend to discuss external developments without providing a clear link to the domestic financial system. Most countries tend to approach the analysis of financial market development in a descriptive manner. In some cases, where there are special issues such as the Euro sovereign debt crisis, the analyses in many of the FSRs are on the series of events occurring in the Euro area. Moreover, broad discussions of macroeconomic topics (such as inflation and economic growth) have at times the propensity to be too similar to other central bank publications, such as inflation reports and annual reports, without making a clear link to financial sector soundness.

[12] Other publications by Bank of Spain, such as the Annual Report or the Economic Bulletin, do feature detailed analysis on this matter.

Table 3. Coverage of Systemic Risks across Countries



Source: FSRs and authors' analysis. For methodology on how the coverage is measured, see Appendix IV.

The reviewed FSRs' coverage of financial market conditions tends to be rather descriptive, with some exceptions. The FSRs are relatively consistent in including financial markets in their discussion of systemic risks. In just a few cases, the reports provide in-depth analysis of certain aspects in the financial markets. For example, Korea's FSR provides an analysis of credit spread in the domestic bond markets (presumably reflecting the importance of the corporate debt market in Korean firms' financing). Given the high level of capital inflows into the domestic bond market, there is also an analysis in the Korean and South African FSRs of the linkages between the trends in inflows and other market segments, such as the foreign exchange market. Likewise, for New Zealand there is an extensive discussion of the foreign exchange market and how it would affect the financing of the domestic banks and firms. Otherwise, FSRs are often limited to describing trends in financial market indicators, such as equity market indices and bond yields.

In general, the issues and developments highlighted in the FSRs examined are consistently followed up in subsequent FSRs. A significant discussion in the FSRs centers on developments in ratios and trends in various indicators. Therefore, most FSRs are quite consistent in following up on the progress of these ratios and indicators as well as the causes or the triggering factors behind this trend. Notable exceptions are Iceland's 2009 and 2010 FSRs, in which much of the discussion centers on specific developments that occurred during Iceland's financial crisis. In some cases, the executive summary compares the current overall risks to the financial system with the risks at the time of the previous FSR. This risk comparison is usually presented in the form of a table or a diagram. Korea and New Zealand's FSRs use diagrams while Canada's FSR features both a diagram and a table. Latvia, Iceland, and Brazil's FSRs, however do not include either in the executive summary or the overview section a graphical comparison of how financial system risks have evolved over time.[13]

[13] In 2008, Iceland's FSR featured a diagram showing how financial stability conditions change over time. However, the publication of this diagram (which provided a broad assessment of the financial system, without listing changes

(continued…)

An analysis of the interconnectedness of banks in different countries is not reported regularly in most of the FSRs reviewed**.** There is no regular analysis or explanation of cross-border banking linkages in the FSRs. Occasionally, some countries do perform an ad-hoc analysis of interconnectedness in cross-border banking, depending on current macroeconomic and financial conditions. Canada's FSR provides an analysis of its domestic banks' exposure to European banks following the Euro debt crisis. Similarly, Spain reports on its domestic banks' exposure to Portuguese banks on the back of the Euro debt crisis. Meanwhile, for countries where there is a significant presence of foreign banks such as New Zealand and Latvia, the analysis made is typically on the health of the banking system in the parent country rather than the linkages to the domestic financial system.

No analysis of interconnectedness (i.e., linkages or exposures) among domestic banks is presented in any of the FSRs examined. The only cases of such an analysis were in a box in Korea's November 2010 FSR and a working paper appendix in South Africa's March 2011 FSR. In addition, no analysis of systemically important financial institutions (SIFIs) or of financial conglomerates is found in any of the FSRs. Only Brazil's FSR presented a brief analysis of large bank concentration in its banking system.

An analysis of the links between banks and the non-financial sector is reported more regularly. The eight countries' FSRs regularly feature an assessment of credit risks in banks arising from firms' and households' financial vulnerabilities. The analysis usually involves a description of the performance of the corporate and household sector and its impact on banks' credit risk. Additionally, New Zealand's FSR, for example, also provides a regular analysis of the loan exposures to various corporate sectors, particularly the agriculture sector. More importantly, no analysis of sovereign exposures of the banking system is reported in the FSRs.

D. Is the Analysis of the FSRs Forward Looking?

Forward-looking views, assessments, or projections are neither consistently nor comprehensively reported in the FSRs. The bulk of analyses and discussions of systemic risks tends to rely on the current levels of ratios, such as tier 1 capital ratios and NPLs, the trends of certain indicators, as well as on the underlying factors behind past developments in the financial system. In general, FSRs seldom include statements, assessments, or even survey results that are indicative of what is to be expected in the near term.[14] Most FSRs do, however, provide a qualitative outlook of

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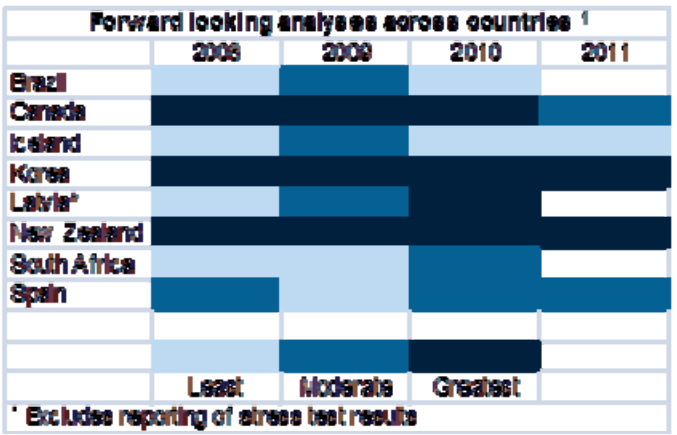
in specific risks relative to the previous FSRs) was discontinued after the 2008 FSR. Also, the introductory part of the Icelandic FSRs features a table listing strengths and vulnerabilities of the financial system, but the table—while useful—does not provide an evaluation of the changes in particular risks over time.

[14] It worth to note when comparing Iceland with the other countries that Iceland experienced three years ago one of the largest financial crisis ever experienced. The dramatic changes that have occurred since then in the financial system, such as the imposition of capital controls and the establishment of three new banks under severe scrutiny, have moved the focus of the FSRs. Instead of focusing on the pure forward-looking analysis of systemic risks to the system, the FSRs have featured prominently backward-looking and post-mortem type of analysis, and focused on the vulnerabilities revealed by the crisis and their immediate mitigation.

credit risk in the banking system, albeit not on a regular basis. The analysis is less forward looking in some years, when even the FSR's structure is kept relatively unchanged. In this case, Korea is a good example where FSRs are quite consistent and comprehensive in providing some form of forward-looking analysis.

Table 4. Forward-Looking Analyses across Countries



Source: FSRs and authors' analysis. For methodology on how the coverage is measured, see Appendix IV.

E. Quantitative Content of Financial Stability Reports

Out of the eight countries included in the case study, four countries' FSRs reported stress testing results on a regular basis. The FSRs for Canada, Korea, Latvia, and Brazil usually report at least one type of stress test result in each publication. For most of the FSRs reviewed, the stress test results are reported if the prevailing conditions in the financial system or the economy are considered a matter of concern. In some cases, the stress tests are done by other regulators such as the APRA[15] for New Zealand banks, the FME[16] in Iceland, and the ECB for Spain. It is worthwhile to note that, while Canada's FSRs report stress test results regularly, the stress tests reported are only on households without providing any linkage to the domestic financial system (Table 5).

[15] APRA: Australia Prudential Regulatory Authority

[16] FME: Iceland's Financial Supervisory Authority.

Table 5. Stress Test Risks Reported in FSRs

Stress test results reporting across countries						
	Credit	Market	Liquidity	Contagion	Household	Others
Brazil	■	■	■			
Canada					■	
Iceland	■					
Korea	■	■				
Latvia	■	■	■			
New Zealand	■				■	
South Africa*						■
Spain	■	■				

*South Africa reported results on stress testing on its short term debt to reserves ratio

Source: FSRs and authors' analysis.

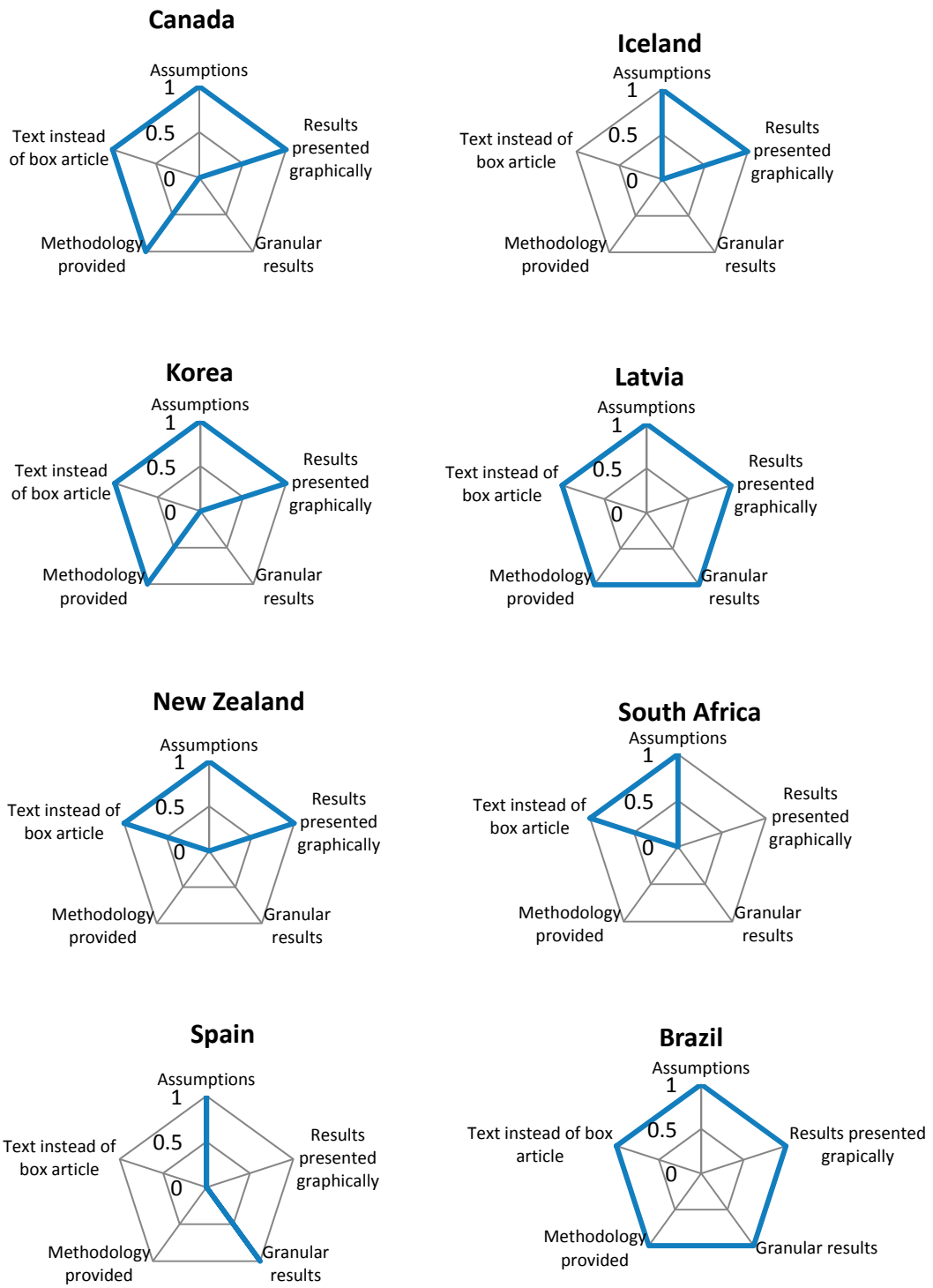
The results of stress tests are usually reported at the aggregated level. Typically the results and numbers derived from the stress tests are for the overall banking system, without providing any granularity on individual banks or even a particular segment in the banking system, e.g., savings banks. Only three countries' FSRs attempt to report the results at a more granular level, i.e., Latvia, Brazil, and Spain. Reporting of the stress test results is often presented as part of the regular text of the report and occasionally a graphical presentation is included in the form of a table or chart (Figure 2).

The underlying assumptions of the stress test are usually provided. Stress test assumptions such as the magnitude and level of the shock are usually presented clearly in the FSRs. The description of the methodology of the stress tests is usually not given in the FSRs reviewed, albeit with some exceptions. Brazil presents the methodology of the stress test in an annex of its FSRs. Latvia's FSR provides the methodology for its credit risk model, while Korea's FSR presents the methodology for its Value at Risk (VaR) analysis of household credit, and Canada's FSR provides an explanation of its expected loss model.

Some FSRs also feature the application of other quantitative techniques in addition to stress testing. Some of these quantitative techniques usually involve the construction of some form of index or measure to gauge certain conditions in the financial system. In Korea and South Africa's FSRs, an index to measure stability in the foreign exchange market[17] is used in their analysis of exchange market pressure. Similarly, Latvia's FSR also constructs a Financial Stress Index for its banking sector.

[17] The Exchange Market Pressure Index (EMPI) in Korea and Index of Exchange Market Pressure (IEMP) in South Africa.

Figure 2. Reporting of Stress Test Results across Countries, 2008–11
(In any of the years)



Source: FSRs and authors' analysis. For methodology on the construction of the diagram, see Appendix IV.

Only two countries' FSRs feature a standardized table on the aggregated banking ratios or financial soundness indicators (FSIs) of recent years. South Africa consistently publishes in its FSR a standardized table of its aggregated banking ratios, while Latvia publishes a similar table as an appendix to its FSR. For the remaining countries, some aggregated banking ratios are reported graphically, typically to support the relevant sections in the FSR. However, the ratios used tend to vary from one year to the next and, in a few countries' FSR, some of the ratios are not consistently included.[18]

F. Are Macroprudential Policies Discussed in FSRs?

Most FSRs tend to dedicate a specific section in the report, either as a stand-alone segment or a box, to discussing or listing the various policies implemented. Of the four main groups of policy measures (macroeconomic, macroprudential, microprudential, and crisis management), one would expect that the FSRs would focus on macroprudential measures, with the discussion of policies closely tied to the risks and vulnerabilities. Moreover, the impact of outcomes from the financial stability analysis of the behavior of agents would be stronger if policy actions followed a risk assessment of the financial system.

Examination of the eight case studies finds that, in practice, discussions of policies in FSRs extend beyond macroprudential policies. Many of the examined FSRs include wide- ranging discussions of macroeconomic and microprudential policies, regulatory changes, developmental policies as well as monetary policies. Korea, for example, discusses infrastructure and developmental measures on improving access to financing for small and medium enterprises (SMEs) in one of its FSRs, while South Africa touches on the merger between the Johannesburg Stock Exchange and the Bond Exchange of South Africa. Latvia regularly discusses the monetary policy measures taken by the central bank.

Changes or updates in regulation or legislation are also discussed. Examples are the new responsibilities granted to the Reserve Bank of New Zealand as the regulator for non-bank deposit takers (NBDTs) and the announcement of the new financial stability mandate for the central bank in South Africa. We also observe that in the 2008 FSRs, all countries discuss at great length the various measures taken to mitigate the impact of the financial crisis. For Iceland, in particular, the crisis measures continue to be discussed until the more recent FSRs.

In addition to policies and measures implemented, some FSRs also include broad discussions of global policy-related developments. Canada, for example, as a member of the G-20, regularly features developments and progress on financial stability made in the G-20 meetings. Other countries, such as Latvia, New Zealand, and Brazil, have provided a detailed analysis of the reforms taking place with the Basel II framework.

While the discussion of policies in the FSRs reviewed is extensive, these discussions are seldom linked to the impact of those policies on financial stability. Furthermore, there are occasions

[18] Some countries may publish a table on aggregated banking ratios or FSIs separately from the FSR.

when the reports do not provide a clear link between the risks that have been identified in the analysis and the policy actions planned to address them. While in certain situations the aim or objective of the policy is stated, there are also a significant number of occasions when the link between the policy and the risks that have been identified is not clearly established. This is evident in Latvia's FSR in the discussion of the removal of anti-inflation measures (a minimum down-payment for real estate purchases and a personal income tax for selling real estate that is held less than five years). In addition, in cases where the aims of the policy are provided, these objectives are sometimes rather broad and not linked directly to the risks or vulnerabilities in the financial system.[19]

G. To What Extent Are FSRs Candid about Data Gaps?

FSRs rarely caution or raise any concerns regarding data gaps. Most FSRs do not inform the reader on any issues regarding data availability or completeness in their analysis (Figure 3). The most notable exception is Iceland's FSR, which gives an explicit caution in the 2009 and 2010 FSRs about some data-related shortcoming during its financial crisis. Specifically, the report acknowledges some uncertainty related to banking system loan data, given the ongoing restructuring of its domestic banks. Additionally, Iceland's FSR also warns the readers on the incompleteness of households' balance sheet data. Canada's FSR, in 2008, highlights that the level of disclosure of life and health insurance companies is not as detailed as banks' disclosure and that recent events underline the need for further enhancements.

H. Standardization of the FSR Publication

A review of the case studies suggests a scope to improve standardization in the timing of the FSR release, period of coverage, and regularity. Most FSRs reviewed are published semi-annually, while some have increased their frequency from annual to semi-annual. In our sample, only Latvia currently publishes an annual FSR. Also in the case of Latvia, the release of its annual FSR is delayed somewhat; for example, the report covering developments in 2010 was released in July 2011. FSRs in New Zealand, Canada, Korea, and South Africa have standardized timings for release of the reports. Furthermore, these four countries' FSRs also have a standardized period of coverage for each FSR publication. For FSRs that do not have a pre-determined timing for their release, the period of coverage either differs from one publication to the next or else it is not announced.[20]

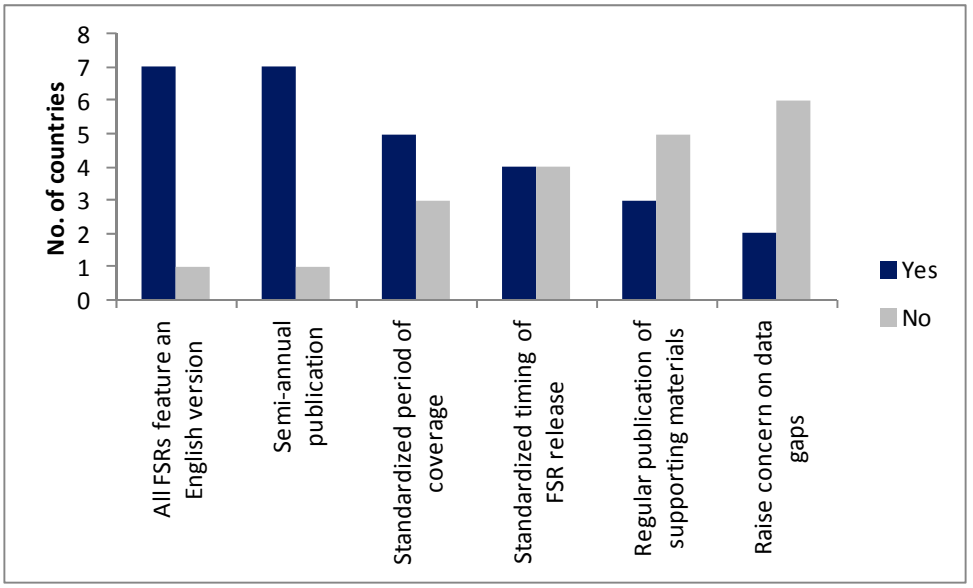
[19] It is worth to point out that there are two types of central banks facing different challenges: the ones without supervisory functions and the others with supervisory functions. The former type has limited means to take tangible policy actions following the analysis presented in FSRs because of the lack of tools. The latter types have the means to address vulnerabilities indentified in the FSRs but face the challenges of transparency and communication—supervisors have full access to confidential data that cannot be published. This goes beyond the scope of this paper, but it is an interesting direction for future research.

[20] In Spain, according to information from central bank staff, the FSR in 2010 was published ahead of the schedule in response to increased interest in the report from market participants.

Most FSRs that we examined feature an English version, made available via the central bank website**.** In most cases, the links to the reports are easily visible on the websites, usually listed under the central bank's publications or financial stability materials. The only exception is Brazil, whose 2009 and 2011 reports are only published in Portuguese and the reader is not informed of this development in the English version of the central bank's website.

A majority of the FSRs in our sample were not accompanied by other supporting materials when released. But there are exceptions. In particular, New Zealand is an example of a country that publishes its FSR with other informative materials, i.e., a spreadsheet file containing the data used in the FSR, a press release statement as well as a webcast of the press conference for the FSR release. Other countries have taken steps in this direction. Specifically, South Africa provides some of the data used in the FSR either in PDF or excel, and Canada includes press highlights of the report, and Iceland attached some data to its 2008 and 2011 FSRs.[21]

Figure 3. Standardization of the FSR Publication and Data Gap Concerns



Source: Central banks' FSRs.

[21] While Brazil's FSRs are supplemented by spreadsheet files, the information is only available in the Portuguese version of the central bank's website. English users of the FSRs may therefore not be aware of the availability of the supplementary data provided. The lack of additional data in the FSRs for Iceland between these two publications could be attributed to the restructuring process of the domestic financial system following the financial crisis. The Bank of Korea started to post the underlying data for the FSR in an Excel file on the Korean version of the central bank website in October 2011.

IV. Is There an Empirical Link between FSRs and Financial Stability?

The previous section's review of the eight FSRs in recent years suggests that there is considerable scope to strengthen the quality of financial sector surveillance in the reports to serve as an effective device to monitor systemic risk. To see if these findings can be generalized, this section evaluates the empirical link between FSRs and financial stability using a much broader sample of FSRs over a longer period of time. We aim to answer the following questions. Are countries that publish FSRs less vulnerable to banking crises? Is there a relationship between FSRs and other dimensions of financial stability such as banking and sovereign ratings and stock market volatility? Does FSRs' analytical quality matter for financial stability? Does the quality of the analysis translate into lower crisis probabilities, higher ratings, and reduced financial volatility?

The link between FSRs and financial stability has remained largely unexplored in the existing research. There is a related stream of literature, which focuses on the relationship between transparency and financial stability. Overall, the evidence appears mixed. Focusing on bank-level transparency, Nier (2005) finds that increased transparency reduces the likelihood of severe banking problems and thus enhances financial stability. Born and others (2011) suggest that ECB's communication on financial stability moves financial stocks in the expected direction, at least in the short-term, and reduces their price volatility. However, the empirical analysis in Čihák (2006) points to only a weak relationship between FSR publication and various financial stability features. Findings in Oosterloo and Jong-A-Pin (2007) suggest that FSR transparency, measured by the number of published financial soundness indicators, seems unrelated to the health of the banking system.

To date, there has been no comprehensive empirical investigation of the link between FSRs and financial stability. Prior findings are largely based on univariate analysis and focus on a single transparency indicator.[22] The analysis in this section attempts to fill this void by exploring a range of financial stability indicators and FSR-related variables. The econometric analysis examines whether countries that publish an FSR enjoy, on average, greater financial stability than those that don't publish an FSR. It also investigates the benefits of publishing a higher-quality FSR, relative to publishing a lower-quality FSR. Presumably, when done well, FSRs can promote financial stability, by providing clearer signals to market participants, policy makers and regulators. In what follows, we test whether higher-quality FSRs are indeed associated with more financial stability.

A. Data

The analysis explores the link between FSRs and various dimensions of financial stability. We consider a range of dependent variables: (i) a binary systemic banking crisis variable based on Laeven and Valencia (2010); (ii) Moody's Bank Financial Strength Ratings (BFSR); (iii) a

[22] There is no a generally agreed operational definition of financial stability.

measure of volatility of the national stock market; (iv) the International Country Risk Guide (ICRG) sovereign financial risk rating; and (v) Moody's KMV 1-year median banking system Expected Default Frequency (EDF).

The variables measuring banking crises, financial strength ratings, and stock market volatility are constructed as follows. The binary crisis variable follows the methodology in Laeven and Valencia (2010). Systemic banking crises are defined as cases where at least three of the following interventions took place – extensive liquidity support, significant restructuring costs, significant asset purchases, significant guarantees on liabilities, and significant nationalizations. Moody's BFSR reflects a bank's financial strength relative to the universe of other rated banks globally, based on an assessment of banks' risk management, regulatory and operating environment, financial fundamentals, and franchise value. We construct an aggregate rating for each banking system using as weights the individual banks' share in the system's total assets. For the purpose of the quantitative analysis, we assign numerical values to the letter ratings with higher values corresponding to lower ratings. Our measure of stock market volatility is the 360-day standard deviation of the return on the national stock market index that is provided by Bloomberg.

Sovereign risk is captured by the International Country Risk Guide (ICRG) Financial Risk Rating. The rating measures a country's ability to finance its obligations by assigning numerical points to a pre-determined group of risk factors such as foreign debt as a percentage of GDP, foreign debt service as a percentage of exports, current account as a percentage of exports, net international liquidity as months of import cover, and exchange rate stability. A lower point total reflects higher sovereign financial risk.

The analysis exploits also a bank soundness indicator, namely Moody's KMV Expected Default Frequency (MKMV EDF). EDFs are market-based default probabilities derived from firm-level equity prices and accounting data. MKMV's structural default risk model is a proprietary commercial application, which builds on the insights in Merton (1974) but calibrates the default probabilities on real-world default rates. Thus, the EDFs represent real-world default probabilities calculated over forward-looking horizons ranging from 1 to 10 years for financial and non-financial publicly traded firms. We utilize the 1-year median banking system EDF, which is available for more than 50 banking systems.

We use two FSR variables in the analysis: (1) the FSR publication dummy that indicates whether or not 132 countries in our sample published an FSR during 2000–09, and (2) the FSR composite quality rating for a subsample of 44 countries during 2000–09.[23] On the latter, the quality of the

[23] Out of the 86 FSR publishers as of November 2011 (Appendix I), 74 countries published FSRs over the 2000–2009 period. The quality ratings were produced for 44 of these FSRs— the same sample as in Čihák (2006). The reason for focusing on this subsample, beyond comparability with Čihák (2006). was the need to assess consistency across reports. To do that, it is important to have several years of FSRs. The quality ratings therefore exclude the new entrants and focus on countries with at least four years of 'track record'. The data panel is unbalanced because we do not have observations for all countries over the whole period, Not all the countries had an FSR starting right

(continued…)

five elements as well as their three characteristics[24] is rated following the methodology in Čihák (2006) (Table 1 and Appendix II). We construct a composite FSR quality rating, which is a weighted average of the ratings of the individual elements and characteristics. The composite rating ranges from 1 to 4 with 1 corresponding to the lowest quality and 4 to the highest quality.[25]

B. The Empirical Model

The literature on banking crises typically estimates a probit model, where the likelihood of a crisis is modeled as a function of the variables of interest and a set of control variables. Our empirical strategy is consistent with this approach and models financial stability as a function of the FSR variable of interest and a range of controls. We control for specific features of the banking system as well as the macroeconomic and institutional environment, which may be related to financial stability. In line with prior research, we expect to find a positive relationship between FSR publication and quality and financial stability or the lack of a robust relationship.

We start with a probit model of banking crises and proceed with several random GLS panel specifications which model Moody's BFSR, stock market volatility, the ICRG sovereign financial risk rating, and Moody's KMV banking system EDF. The analysis is conducted on annual data that span 2000 to 2009 since the majority of FSRs were launched during that period (Čihák, 2006 and Oosterloo et al., 2007). Most control variables enter with a 1-year lag, which is consistent with the crisis literature and helps mitigate any endogeneity issues in the regressions. We do not lag the FSR indicators, since their analytical content typically refers to the previous year.[26]

We estimate a multivariate probit model or a random GLS panel as follows:

$$FS_t = \beta_1 + \beta_2 FSR_t + \beta_3 MACRO_{t-1} + \beta_4 BANK_{t-1} + \beta_5 IQ_{t-1} + \mu_t \qquad (1)$$

where FS_t is the financial stability variable for country *i* at time *t,* (probability of a banking crisis, or Moody's BFSR, or the standard deviation of the return on the national stock market index, or ICRG Financial Risk Rating, or the 1-year median banking system EDF); and FSR_t stands for the FSR variable of interest. We estimate two different versions: (i) one with a FSR dummy variable taking a value of unity if country *i* publishes an FSR at time *t* and zero

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at 2000, but they all began publishing a FSR in the first half of the sample period (2000–2005) and very often shortly after 2000.

[24] The five elements are aims, issues, overall assessment, tools, and structure, while the characteristics are clarity, consistency, and coverage (see Section III).

[25] The value 4 is the theoretical maximum. In our sample, the scores range between 1.00 and 3.66.

[26] The results are robust to the alternative specification in which the FSR quality variables enter with a one-year lag. The FSR quality variables continue to be significant at the same level and the coefficient estimates have the same sign and similar magnitudes.

otherwise, and (ii) one with the FSR quality ratings. $MACRO_{t-1}$, $BANK_{t-1}$, and IQ_{t-1} are the macroeconomic, banking and institutional quality controls for country *i* at time *t-1* respectively, and μ_t is standard white-noise disturbance.

The estimation proceeds in two steps. The first step focuses on the full sample and examines whether the countries that published an FSR in the 2000–2009 period have on average greater financial stability. This is accomplished by estimating the model with the FSR publication dummy. A significant coefficient in the expected direction is interpreted as evidence that FSR publication may contribute to financial stability. The second step examines the link between FSR quality and financial stability, focusing on a subsample of 44 FSR publishers. We fit the model on the composite rating as well as the individual elements and characteristics. In order to shed more light on their relative importance we also assess their joint significance.

Prior research has found that the decision to publish an FSR is not random but influenced by a range of factors such as past occurrence of systemic banking crises, available resources, and European Union membership (Oosterloo and Jong-A-Pin, 2007). Thus, our FSR publication dummy may not be exogenously determined, which would result in biased estimates. To control for potential selection bias due to the non-random nature of the subsample of FSR publishers, we perform the two-step Heckman estimation (see Heckman, 1979 for an elaboration on the method).[27]

Our Heckman model consists of two equations: (i) a selection equation, which models the decision as to whether or not to publish an FSR, and (ii) a primary outcome equation, which relates FSR publication to financial stability. The selection equation is a probit model where the probability of publishing a FSR is a function of the past occurrence of banking crises, income (approximated by GDP per capita), the size of the banking system (approximated by the ratio of banking credit over GDP), and the total number of FSRs published by all countries.[28,29] The primary outcome equation includes the inverse of the Mills' ratio (lambda) from the selection equation, which is used to correct the estimates for selection bias.

Thus, to account for the endogeneity of FSR publication we estimate the following two-stage Heckman model, where equation (3) is the revised equation (1):

[27] We do not extend the Heckman two-step procedure to the specifications with the FSR quality ratings since it is less likely that countries would choose the quality of the reports.

[28] The indicator captures a potential "network externality" since publishing an FSR may become more attractive if other countries are also publishing FSRs.

[29] We use the income variable to control for the impact of resource availability on the decision to publish a FSR. To capture the resources available specifically for financial regulation we also considered using the 2008 World Bank database "Bank Regulation and Supervision" compiled by James R. Barth, Gerard Caprio Jr., and Ross Levine but could not use it in the regressions because it provides information only for some of the years in our estimation period.

$$FSR_t = \beta_1 + \beta_2 Crisis_{t-3} + \beta_3 GDP_{t-1} + \beta_4 Credit/GDP_{t-1} + \beta_5 FSRN_{t-1} + \varepsilon_t \quad (2)$$

$$FS_t = \beta_1 + \beta_2 FSR_t + \beta_3 MACRO_{t-1} + \beta_4 BANK_{t-1} + \beta_5 IQ_{t-1} + \lambda_t + \mu_t \quad (3)$$

FSR_t is a binary variable taking the value of unity if country *i* published an FSR at time *t* and zero otherwise. $Crisis_{t-3}$ is a binary variable taking unity if country *i* had a systemic banking crisis at time *t-3* and zero otherwise,[30] GDP_{t-1} and $Credit/GDP_{t-1}$ are GDP per capita and domestic credit over GDP in country *i* at time *t-1* respectively, $FSRN_{t-1}$ is the number of FSRs published by all countries at time *t-1*, $MACRO_{t-1}$, $BANK_{t-1}$, and IQ_{t-1} are macroeconomic, banking and institutional quality controls for country *i* at time *t-1* respectively and λ_t is the inverse of the Mills ratio, defined as the normal probability density of the prediction in (2) divided by the cumulative normal density.

In the selection equation (2), GDP per capita, Credit/GDP, and FSRN are positive and significant at the 1-percent level, while the banking crisis dummy is positive and significant at 10 percent. The estimates suggest a lag of approximately three years from a crisis to the FSR publication.

We use a relatively standard set of macro controls for the primary outcome equation, which have been found to help predict financial instability in other empirical studies (see for example Demirgüç-Kunt and Detragiache, 2005; Herrero and del Rio, 2005; and Čihák, Muñoz, and Scuzzarella, 2011). Since we rely on a relatively small number of observations, we strive for a parsimonious representation. Thus, our preferred set of macro controls includes the ratio of broad money (M2) to foreign exchange reserves, growth of private credit over GDP, the depreciation of the bilateral exchange rate against the U.S. dollar, and real GDP growth (see Appendix III for a detailed description of the control variables).

The use of macro controls is based on the following economic rationale. The ratio of broad money to foreign exchange reserves reflects countries' vulnerability to a run on the currency and captures the empirical link between currency and banks identified in the literature (see for example Kaminsky and Reinhart, 1999). Higher M2-to-reserves ratios are on average associated with more frequent banking crises. Excessive growth of private credit over GDP and exchange rate misalignments have been also identified as providing leading signals of banking crises in the early warning literature (Kaminsky and Reinhart, 1999). In order to control for business cycle effects, we include also lagged real GDP growth. We also control for weaknesses in banks' initial financial health using financial soundness indicators. Our preferred specification includes the cost-to-income and credit-to-deposit ratios. Cost-to-income ratios capture banks' operating efficiency and have been found to help predict banking crises (Čihák, Muñoz and Scuzzarella,

[30] The banking crisis variable enters significantly in its three-year lag, while in this specification the first and second lags are not significant. However, the results are generally not sensitive to the lags used. We interpret the significance of the three-year lag as evidence that countries start publishing a FSR typically only a few years after having a banking crisis.

2011). Credit-to-deposit ratios measure banks' reliance on volatile wholesale funding. Hence, the higher the ratio the more vulnerable the banks may be to a funding shock. Recent studies on the crisis have found that reliance on wholesale funding may increase the probability of bank failures (Bologna, 2011).

We also consider institutional quality effects. If countries with better institutions tend to publish higher-quality FSRs, omitting such effects would bias up the coefficients on FSR quality. We use the World Bank worldwide governance indicators (see Kaufmann, Kraay and Mastruzzi, 2010) to control for institutional quality. The indicators measure six different aspects of governance–voice and accountability, political stability and lack of violence, government effectiveness, regulatory quality, rule of law, and control of corruption. We construct a composite governance indicator, where regulatory quality accounts for 60 percent, government effectiveness, rule of law, and control of corruption for 10 percent, and voice and accountability and political stability for 5 percent.[31] The regression results are robust to various alternative weightings of the governance index, including a simple average.[32]

C. Results

The econometric analysis finds little evidence of a direct relationship between FSR publication and financial stability. Publishing an FSR by itself does not seem to reduce financial risks. The FSR publication dummy is not significant across most specifications, but the stock market volatility equation is significant at 10 percent (Table 6). The significant FSR impact on volatility is consistent with Born and others (2011). The lambda is significant across the specifications and negative in the specifications with banking crises, stock market volatility and Moody's EDFs. Thus, the unobserved factors that make an FSR publication more likely tend to be associated with lower probability of a banking crisis and stock market volatility.

However, for the 44 FSR publishers for which FSR quality ratings are available, we find that higher-quality FSRs are associated with greater financial stability. The composite FSR quality rating has the expected sign and is significant at the 1-percent level in the probit model of banking crises, and at 5 percent in the panel models with Moody's BFSR and the volatility of the national stock markets. The results suggest that there might be an empirical link between the quality of the financial stability analysis in the reports and these dimensions of financial stability.

We performed robustness tests by fitting the model on each individual element and characteristic. The coefficients on the individual quality ratings have the expected sign and are

[31] "Government effectiveness" indicator includes the quality of civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. The "Regulatory Quality" includes perceptions of the ability of the government to formulate and implement sound policies, and regulations that permit and promote private sector development.

[32] Ideally one would have wanted to control for the quality of macro-prudential policies, but such an index does not exist as of today.

generally significant in the specifications with banking crises, Moody's BFSR, and stock market volatility (Appendix V, Appendix Tables 1–5). Although the size of the coefficients is broadly similar, they show a somewhat higher average sensitivity of the predictions to the "data, assumptions and tools" element.

We also estimated several elements or characteristics jointly. For example, we fit together (i) "aims," "issues," and "tools"; (ii) "overall analysis" and "structure;" and (iii) "consistency," "clarity," and "coverage". The joint estimation lacks robustness due to strong collinearity in the quality ratings. Thus, although the ratings are individually significant, they lose significance and change signs if estimated jointly. Another caveat of the estimation is the limited time variation of the rating variables.

The macroeconomic, banking and institutional quality controls generally have the expected sign. The estimates show that financial stability is negatively associated with credit-to-deposit, cost-to-income, and broad money to reserves ratios, growth of private sector credit over GDP, as well as FX depreciation, and positively associated with real GDP growth. The explanatory power of the regressions is broadly acceptable given the heterogeneous sample and limited variation in some variables.

Table 6. Summary Regression Results

(Estimation period: 2000–2009)

	Banking crisis 1/ (probit model)		Moody's BSFS rating 2/ (GLS panel)		Stock market volatility 3/ (GLS panel)		Sovereign risk rating 4/ (GLS panel)		MKMV's EDF 5/ (GLS panel)	
	(1) 6/	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Control variables:										
M2 to reserves (t-1)	0.007***	0.026***	0.000	0.000	0.016	0.015	-0.003	-0.020	0.001	0.004
	(0.002)	(0.008)	(0.000)	(0.001)	(0.015)	(0.049)	(0.005)	(0.017)	(0.001)	(0.003)
Depreciation	0.029**	0.037*	0.001	0.000	0.444***	0.511***	-0.022	-0.013	0.012*	0.011
	(0.012)	(0.020)	(0.001)	(0.001)	(0.071)	(0.074)	(0.015)	(0.021)	(0.007)	(0.008)
Real GDP growth (t-1)	-0.048	-0.006	-0.001	-0.005	-0.441**	-1.105***	-0.004	-0.188**	0.011	0.011
	(0.035)	(0.078)	(0.003)	(0.004)	(0.216)	(0.322)	(0.044)	(0.093)	(0.025)	(0.041)
Growth of private credit over GDP (t-1)	0.823*	1.968**	0.053	0.083	-1.495	3.387	-2.848**	-0.927	-0.226	-0.191
	(0.450)	(0.836)	(0.049)	(0.057)	(4.398)	(4.073)	(1.140)	(1.457)	(0.202)	(0.277)
Credit-to-deposit ratio (t-1)	1.235***	1.524***	0.099***	0.085**	2.695	4.918*	-3.018***	-3.869***	-0.324*	-0.196
	(0.327)	(0.461)	(0.031)	(0.037)	(3.521)	(2.777)	(0.796)	(1.110)	(0.196)	(0.205)
Cost-to-income ratio (t-1)	1.372***	1.413*	0.023	0.101**	4.100	1.800	0.355	-1.448	-0.019	-0.406
	(0.455)	(0.722)	(0.034)	(0.048)	(2.984)	(3.086)	(0.650)	(0.882)	(0.257)	(0.386)
Governance index (t-1) 7/	-0.591**	-0.397	-0.156***	-0.214***	-9.340***	-5.999***	0.789	1.753*	-0.471***	-0.167
	(0.290)	(0.408)	(0.026)	(0.033)	(2.715)	(2.123)	(0.596)	(1.063)	(0.144)	(0.145)
Lambda (inverse of Mills' ratio) 8/	-1.200**		0.197***		-10.476***		-4.855***		-1.158***	
	(0.610)		(0.056)		(3.539)		(0.733)		(0.338)	
FSR variables:										
FSR publication dummy 9/	-0.137		-0.012		-3.233*		-0.182		0.080	
	(0.282)		(0.026)		(1.883)		(0.459)		(0.123)	
FSR composite quality rating 10/		-1.413***		-0.101**		-5.544**		1.468		0.014
		(0.499)		(0.040)		(2.789)		(1.294)		(0.176)
Constant	-3.354***	-2.299*	0.426***	0.795***	40.162***	42.231***	46.268***	40.143***	1.898***	1.059*
	(1.062)	(1.392)	(0.086)	(0.103)	(7.884)	(7.005)	(1.621)	(3.152)	(0.521)	(0.576)
Number of observations	622	194	195	104	356	190	565	194	158	98
R2	0.44	0.45	0.64	0.66	0.14	0.34	0.03	0.08	0.17	0.17
Model X^2	111.0	58.2	113.5	90.6	110.3	107.4	58.6	26.3	30.8	17.2

note: *** p<0.01, ** p<0.05, * p<0.1.

1/ As defined in Laeven and Valencia (2010). The dependent variable takes a value of unity if there is a crisis and zero otherwise.

2/ Moody's Bank Financial Strength Rating (BFSR): weighted average of the financial strength ratings of the individual banks in the country that are rated by Moody's. The composite letter rating is mapped into a numerical index with higher values assigned to lower ratings and vice versa.

3/ 360-day annualized standard deviation of the daily return on the national stock market index.

4/ The International Country Risk Guide (ICRG) sovereign financial risk rating measures a country's ability to finance its official, commercial, and trade debt obligations. Low values indicate high risk and vice versa.

5/ The banking system median default probability as measured by MKMV's 1-year Expected Default Frequency (EDF).

6/ Two-step Heckman estimation of models (1), (3), (5), (7), (9). The decision to produce a FSR is modeled in a first-stage Heckman selection model as a function of the incidence of past banking crises in the country, GDP per capita, bank credit to GDP, and the total number of published FSRs. The second-stage modeling of the relationship between financial stability and FSR publication include the Heckman correction (lambda) for sample selection bias.

7/ Weighted average of the 6 governance indicators defined in Kaufman, Kraay and Mastruzzi (2010), which cover 6 aspects of governane: voice and accountability, political stability, government effectiveness, regulatory quality, rule of law and control of corruption. Higher values indicate better governance.

8/ Lambda (inverse of Mills' ratio) =f(x)/F(x), where f(x) is the pdf and F(x) is the cdf. The ratio is derived in the first-stage estimation of the Heckman selection model.

9/ Takes a value of unity if the country published a financial stability report that year and zero otherwise.

10/ Weighted average of the quality ratings of the FSR elements and characteristics.

V. Concluding Remarks

The global financial crisis has renewed policymakers' interest in developing an effective framework for financial stability. In many countries, the current framework includes the central bank's financial stability reports. To what extent and in what form these reports contribute to the new framework is an open question.

We have examined the recent experience with central banks' financial stability reports around the word, using a combination of econometric analysis with a more in-depth analysis of selected case studies.

Our analysis suggests that, despite some progress in recent years, there is still room for improvement in terms of their clarity, coverage of key risks, and consistency over time. A major drawback is that FSRs lack a forward-looking perspective and an interconnectedness view, thus making them less capable of assessing systemic risk.

In the econometric analysis, we have found that publication of an FSR per se does not have a robust empirical link to financial stability. But what seems to matter is the quality of the FSR, in terms of its clarity, coverage, and consistency over time. We are finding that higher-quality reports tend to be associated with more stable financial environments.

There is substantial scope for further research in this area. One interesting avenue for research is to break down into more detail the channels by which higher FSR quality promotes financial stability. It would be useful to know more specifically, for example, to what extent the positive relationship is due to improved information in the market and stronger market discipline, to what extent it is due to the signals the FSR provides for policymakers and regulators, and what is due to other factors.

APPENDIX I. LIST OF FSRS AROUND THE WORLD (AS OF NOVEMBER 2011)

	Jurisdiction	FSR since 1/		Jurisdiction	FSR since 1/
1	Albania	2007	44	Jordan	2010
2	Argentina	2004	45	Kazakhstan	2006
3	Australia	1999	46	Kenya	2004
4	Austria	2001	47	Korea	2003
5	Armenia	2007	48	Kyrgyzstan	2004
6	Azerbaijan	2010	49	Latvia	2003
7	Bahrain	2007	50	Lithuania	2006
8	Bangladesh	2006	51	Luxembourg	2005
9	Barbados 2/	2011	52	Macao, SAR	2005
10	Belarus	2007	53	Macedonia	2006
11	Belgium	2002	54	Malaysia	2006
12	Bhutan	2006	55	Malta	2008
13	Bolivia 3/	2006	56	Mexico	2006
14	Bosnia	2007	57	Namibia	2008
15	Botswana	2002	58	Netherlands	2004
16	Brazil	2002	59	New Zealand	2004
17	Canada	2002	60	Norway	1997
18	Cape Verde 4/	2008	61	Pakistan	2006
19	Chile	2004	62	Paraguay 3/	2009
20	China, People's R.	2005	63	Philippines	1999
21	Colombia	2002	64	Poland	2001
22	Croatia	2005	65	Portugal	2004
23	Czech Republic	2004	66	Qatar	2009
24	Denmark	2002	67	Romania	2006
25	El Salvador 3/	2007	68	Russia	2001
26	Euro Area	2004	69	Rwanda	2009
27	Estonia	2003	70	Serbia	2005
28	Finland	2003	71	Seychelles	2009
29	France 5/	2002	72	Singapore	2003
30	Germany	2004	73	Slovak Republic	2003
31	Georgia	2006	74	Slovenia	2004
32	Ghana	2005	75	South Africa	2004
33	Greece	2004	76	Spain	2002
34	Hungary	2000	77	Sri Lanka	2004
35	Hong Kong SAR	2003	78	Sweden	1997
36	Iceland	2000	79	Switzerland	2003
37	India	2010	80	Taiwan	2008
38	Indonesia	2003	81	Tanzania	2010
39	Ireland 5/	2000	82	Trinidad and Tobago	2010
40	Israel 5/	2003	83	Turkey	2005
41	Italy	2010	84	Uganda	2009
42	Jamaica	2005	85	United Kingdom	1996
43	Japan	2005	86	United States 6/	2011

Source: Authors, based on information from the relevant websites.

1/ "FSR since" means that an FSR has been publicly available for that jurisdiction since that year.

2/ A (semi-annual) FSR will be published in 2011, but it is not posted yet.

3/ Online version in Spanish only.

4/ The FSR was only published in 2008.

5/ FSR publication discontinued / relevant issues covered in another publication.

6/ FSR published by a body different from the central bank.

APPENDIX II. GOOD PRACTICES IN FSRS

This appendix provides additional information on the good practices for financial stability reports proposed in Čihák (2006), based on the earlier framework used by Fracasso, Genberg, and Wyplosz (2003) to assess 'quality' of inflation reports. In this 'CCC framework', each FSR is decomposed into five main elements: (A) aims, (B) the overall assessment presented in the report, (C) the issues that are covered, (D) the data, assumptions, and tools that are being used, and (E) other features such as the reports' structure. For each of these five elements, the framework focuses on three characteristics: clarity, consistency, and coverage ('CCC framework). The text below provides, for each of the five elements, a specific description of what is considered good practice in this framework.

The framework allows for grading FSRs against these 'good practices' (and for self-assessing by FSR authors). Each of the elements can be assessed on the scale from 1 (worst) to 4 (best). Let us illustrate this in relation to the example of good practice A1 ("the definition of financial stability should be clearly indicated"). An FSR would receive a grade of 1 on this practice (i.e., no compliance) if it contained no definition of financial stability whatsoever. It would receive a grade of 2 ('partly compliant') if it did not contain a clear, explicit definition of financial stability, but there would be an implicit or indirect definition or it could be found in another document. It would receive a grade of 3 ('largely compliant') if the FSR contained a definition of financial stability but it was not very clearly indicated. It would receive a grade of 4 if the FSR clearly defined financial stability in a way that would enable a reader, and in particular a first-time reader, to understand the FSR's statements on financial stability.

To facilitate aggregation of the individual grades, the descriptions of good practices below are accompanied by the proposed weights of the individual practices in the overall (composite) grading. The weights are chosen so that they are distributed evenly across the 3 Cs, and approximately evenly across the 5 elements (with less weight on the 'other' elements), and ensuring that the weights add up to 100 percent. Sensitivity checks suggest that the overall results are rather robust with respect to changes in the individual weights.

A. Reasons, Aims, Objectives

A1. *The aims of the report should be clearly indicated.* Clarifying the aims helps the reader, and in particular a first-time reader, to understand why certain topics are covered or omitted in the FSR (3 percent).

A2. *The definition of financial stability should be clearly indicated.* Clarifying the definition of financial stability helps the reader, and in particular a first-time reader, to understand the FSR's statements on financial stability (3 percent).

A3. *The definition of financial stability should be a standard part of the report, presented consistently across reports.* Ideally, the definition should be placed in a conspicuous

place, where it can be easily found, such as a box on the inside cover or in the introduction (3 percent).

A4. *The statement of aims should be a standard part of the report, presented consistently across reports.* Ideally, the statement of aims should be placed in a conspicuous place, where it can be easily found, such as a box on the inside cover or in the introduction (3 percent).

A5. *The definition of financial stability should cover both the absence of a crisis and resilience to a crisis.* Defining financial stability only in terms of financial crises leads to FSRs that are too narrowly focused and may overlook important vulnerabilities. The definition may cover also other issues (such as the absence of asset price bubbles) if it does not hamper the clarity of the definition (3 percent).

A6. *Financial stability should be defined both in general terms and in operational terms*. The general definition of financial stability should be accompanied by an "operational definition of financial stability" highlighting the key indicators (and other information). Coming up with such an operational definition is challenging, and it is a process that may need to be repeated as the system evolves. However, having such an operational definition is very important internally, to help determine the scope of financial stability analysis and hence resource allocation, to facilitate analytical modeling, to motivate the FSRs, and to guide the reports' authors. It would also be important externally, to be better able to communicate the key findings to the reader (3 percent).

A7. *The aims of the report should be comprehensive.* Ideally, the aims should include (i) informing stakeholders of potential financial stability risks and ways to mitigate them; (ii) encouraging informed debate on financial stability issues; (iii) serving as an accountability instrument; and (iv) helping to provide information that major participants in the financial industry may use as part of the input into their own risk assessment procedures (3 percent).

B. Assessments

B1. *The overall assessment should be presented clearly and in candid terms.* The whole report, and especially the assessment, should be clearly written. The main findings should be highlighted. The reader should not be required to "read between the lines" (5 percent).

B2. *The overall assessment should be linked to the remainder of the FSR.* The overall assessment should put together the various pieces of analysis presented in the report, and present an overall picture of the main exposures and risks. The picture should be comprehensive, i.e., if the underlying analysis, such as stress tests, indicates an increase in an important source of risk, this should be recognized in the main conclusions. The overall assessment should be forward looking (i.e., discuss future trends, risks, vulnerabilities) rather than backward looking (i.e., focusing on past trends and developments) (5 percent).

B3. *There should be a clear link between the assessments over time, making it clear where the main changes took place.* The FSR should indicate how the main risks and exposures evolved since the last FSR (typically six months or a year). This can be

facilitated by having a summary statement in each section (e.g., in a small box at the end of each section) highlighting the main changes (5 percent).

B4. *The overall assessment should cover the key topics*. All significant risks and exposures should be reflected in the assessment. No major potential risk should be omitted. The report should not dodge complex but important issues. This may be a challenging principle in relation to politically sensitive risks, such as those relating to government defaults. However, the political sensitivity can be at least partly addressed by using standardized approaches, e.g., stress testing every time for a downgrade in the sovereign rating by a notch (5 percent).

C. Coverage of Issues in FSRs

C1. *The report should clearly identify the main macro-relevant stability issues.* The report should distinguish issues that have a wider systemic impact. Those issues should be covered in the overall assessment and analyzed in some depth. In most financial systems, the banking system is the sub-sector that is the most systemically relevant, and therefore is covered in more depth than other components of the financial sector (6 percent).

C2. *The coverage of issues should be consistent across the reports.* When an issue is identified in one report, the next report should follow up on the issue, or at least indicate why the issue is not covered this time (6 percent).

C3. *The coverage of the financial system should be sufficiently comprehensive.* FSRs typically cover the banking system in the greatest depth, but nonbank financial system and payment infrastructure issues are typically also covered. When some issues are not covered, the lack of coverage should be indicated and justified (6 percent).

D. Data, Assumptions, and Tools Used by FSRs

D1. *It should be clear what data are used to arrive at the results presented in the report.* A cut-off date for the report should be mentioned, ideally on the inside cover page. The underlying data should be made available (with the possible exception of the individual institution data that are subject to confidentiality restrictions), ideally in a supplementary electronic file. When the report presents data in charts and tables, there should be a clear link between the text on the one hand and the charts and tables on the other hand (5 percent).

D2. *It should be clear what assumptions are being used to arrive at the results presented in the report.* Presenting the assumptions is an important part of the report's transparency and credibility. The assumptions should be justified (5 percent).

D3. *It should be clear what methodological tools are used to arrive at the results presented in the report.* In particular, findings based on a full-fledged analysis of detailed information should be distinguished from those based on anecdotal or partial evidence; results based on data for individual institutions should be distinguished from those based only on aggregate data (5 percent).

D4. *The results should be presented in a consistent way across reports.* Presenting results in a consistent way will facilitate comparisons across time. In particular, assumptions of stress tests should be consistent in time. Also, the time horizon over which the report carries out the analysis should be standardized (5 percent).

D5. *The report should use available data, including those on individual institutions.* Omitting data from analysis can result in serious shortcomings. For example, analyzing only data on solvency and disregarding liquidity information can lead to overlooking important risks. Also, using only aggregate data can result in biased results: if exposures are concentrated in weak institutions or borrowers, the results are going to be much worse than if the same exposures are concentrated in strong institutions or borrowers. When important data are missing, this should be clearly identified in the report (5 percent).

D6. *The report should use the available tools.* The report should combine available quantitative tools (e.g., soundness indicators, stress tests, market-based indicators, early warning system results) and qualitative tools (e.g., information on the regulatory framework, qualitative supervisory information, reviews of market participants) to allow for a forward-looking assessment of financial stability. For example, stress tests should be used to assess resilience of systems to shocks. If market-based indicators provide useful information that is not contained in supervisory data, they should be analyzed. If a supervisory early warning system provides useful information that is not contained in stress tests and market-based indicators, its results should be presented, subject to confidentiality restrictions (5 percent).

E. Structure and Other Features of FSRs

E1. *The structure of the report should be easy to follow.* The underlying logic (or the "theme" that links the sections) should be explained to the reader and should provide evidence of an integrated approach to financial sector stability. In some cases, the publishers may find a need for another publication that is less technical than the FSR (more "populist") and better able to explain the central bank's financial stability role to the general public (2 percent).

E2. *Other features of the report—such as its length, frequency, timing, public availability, and links to other central bank reports—should be designed to support its clarity.* The report and the underlying data should be prominently displayed on the central bank's website, and be easy to find and download. The links and demarcation lines between the report and other central bank publications (e.g., an inflation report or a payment system report) should be clear, providing evidence of an integrated central bank approach; overlaps should be kept to a minimum. There should be a comprehensive communications strategy underlying the FSR, including the links to other publications by the central bank and other public bodies (e.g., a separate supervisory agency) (2 percent).

E3. *The structure of the report should be consistent across time to make it easier to follow for repeat users.* In particular, if the report includes ad-hoc articles varying from issue to issue (e.g., under the heading of "Special Reports" or "Selected Issues), it should

clearly distinguish the "core analysis," which is consistent across the reports. To make the "core" accessible and consistent, the editors may have to be ruthless in excluding discussion of interesting but peripheral issues from the core (2 percent).

E4. *The other features of the report should be designed to support its consistency.* In particular, the report should have a well-known, regular, and predictable timetable. The past reports should be available on the website for comparison (2 percent).

E5. *The structure of the report should allow covering of the key topics.* In particular, the FSR should be able to pull together the key messages emerging from the various sub-sectors (e.g., banking, insurance and pensions, and securities markets). The report should not be written using a "silo approach" covering each sub-sector separately; if there are cross-cutting topics, those should be identified (2 percent).

E6. *The other features of the report should be designed to support its coverage.* For example, to be credible, the FSR needs to be up to date, which has implications for the report's timing (2 percent).

APPENDIX III. DESCRIPTION OF DATA SOURCES AND TRANSFORMATIONS

Financial Stability Variables

- Banking crisis indicator variable: takes a value of unity if there was a banking crisis in that year and zero otherwise. Source: the chronology of banking crises follows Laeven and Valencia (2010).

- Moody's Bank Financial Strength Ratings (BFSR): weighted average of the financial strength ratings of the banks in the country that are rated by Moody's. The letter ratings are mapped into a numerical index with higher values assigned to lower ratings and weighted by the banks' total assets. Thus, higher index values imply more fragile banking systems. Source: Moody's and authors' calculations.

- Stock market volatility: a measure of the risk of price moves calculated from the standard deviation of day-to-day logarithmic historical price changes. The 360-day price volatility equals the annualized standard deviation of the relative price change for the 360 most recent trading days' closing price. Source: Bloomberg.

- ICRG Financial Risk Rating: a measure of a country's ability to finance its official, commercial and trade obligations. Risk points are assessed for each of the component factors of foreign debt as a percentage of GDP, foreign debt service as a percentage of exports of goods and services (XGS), current account as a percentage of XGS, net liquidity as months of import cover, and exchange rate stability. Lower values indicate higher risk and vice versa. Source: The PRS Group International Country Risk Guide.

- Moody's 1-year median banking system EDF: the banking system median default probability measured by MKMV's Expected Default Frequency (EDF) over a 1 year forward-looking horizon. Source: Moody's KMV Creditedge database.

Control Variables

- Broad money/foreign exchange reserves. Source: IMF World Economic Outlook and authors' calculations.

- Depreciation: annual percent change in the bilateral exchange rate against the U.S. dollar. Source: IMF World Economic Outlook and authors' calculations.

- Real GDP growth: annual percent change in real GDP. Source: IMF World Economic Outlook and authors' calculations.

- Private credit by deposit money banks / GDP. Source: Beck, Demirgüç-Kunt, and Levine (2010).

- Nominal GDP per capita in US dollars: Source: IMF's World Economic Outlook (WEO).

- Banking system credit / bank deposits: private credit by deposit money banks as a share of demand, time and saving deposits in deposit money banks. Source: Beck, Demirgüç-Kunt, and Levine (2010).

- Banking system cost/income: Banks' operating costs divided by operating income. Source: Beck, Demirgüç-Kunt, and Levine (2010).

- Governance index: a weighted average of the governance indicators produced by Kaufmann, Kraay and Mastruzzi (see Kaufmann, Kraay and Mastruzzi, 2010). The indicators measure six dimensions of governance: voice and accountability, political stability and absence of violence/terrorism, government effectiveness, regulatory quality, rule of law, and control of corruption. The aggregate indicators are based on several hundred individual underlying variables, taken from a wide variety of data sources. The indicators in the composite index are used in the analysis with the following weights – 5 percent for voice and accountability and political stability, 10 percent for government effectiveness, rule of law and control of corruption, and 60 percent for regulatory quality.

APPENDIX IV. NOTES ON THE TABLES IN THE CASE STUDY SECTION

In the case study section III, we examined the coverage of systemic risks in financial stability reports (FSRs) for the eight countries in the sample from the year 2008 to mid-June 2011.

For FSRs that are published semi-annually, we examined the FSR that at least covers part of the second half of a particular year and were published before June 2011. The table below summarizes the FSRs that were used in the case study section:

	Financial stability developments in			
	2008	2009	2010	2011
Brazil	FSR May 08	FSR Oct 09*	FSR Sep 10	
Canada	FSR Dec 08	FSR Dec 09	FSR Dec 10	FSR June 11
Iceland	FSR 2008	FSR 2009	FSR June 10	FSR May 11
Korea	FSR Oct 08	FSR Nov 09	FSR Nov 10	FSR Apr 11
Latvia	FSR 2008	FSR 2009	FSR 2010	
New Zealand	FSR Nov 08	FSR Nov 09	FSR Nov 10	FSR May 11
South Africa	FSR Mar 09	FSR Mar 10	FSR Mar 11	
Spain	FSR Nov 08	FSR Nov 09	FSR Oct 10	FSR May 11

*Brazil's Oct 2009 FSR was published in Portuguese and was translated using Google translate

There were six broad categories of risks in which the FSRs were assessed; banking system, corporate sector and households, non-bank financial institutions, financial markets, interconnectedness of banks, and usage of aggregated banking ratios or financial soundness indicators (FSIs). These six broad categories are then further divided into smaller sub-categories or criteria, and a 'checklist' is made to see if each of the FSRs examined covered the sub-categories. The following table lists the six broad categories with the sub-categories or criteria.

	Sub-categories
Banking sector	• *Financial position / profitability of banks* • *Capital adequacy of banks* • *Funding/ liquidity risk* • *Loan growth* • *Real estate/ housing market* • *Credit risk/ loan quality* • *Lending standards*
Corporate sector and household	• *Financial conditions/ indebtedness and performance of corporate sectors* • *Financial conditions/ indebtedness and wealth of households*
Financial markets	• *Bond markets* • *Equity markets* • *Interbank/ money markets* • *Foreign exchange/ currency markets*

	Sub-categories
Interconnectedness in financial system	• *International banks* • *Domestic banks* • *Conglomerates/ systemically important financial institutions (SIFIs)* • *Government exposures*
Non-bank financial institutions (NBFIs)	• *Analysis either by institutions or at aggregated level*
Aggregated banking ratios or financial soundness indicators (FSIs)	• *Reporting of ratios either in a consolidated table or in graphical format*

An FSR is considered more comprehensive if more of the sub-categories in the checklist are covered in each publication. Additionally, an FSR is considered more consistent if each category of the systemic risk is covered in each year's FSR. The following is an example of the checklist for one of the countries in the case study sample:

		Country A			
		2008	2009	2010	2011
Banking sector	Financial position/ profitability of banks	✓	✓	✓	✓
	Capital adequacy	✓	✓	✓	✓
	Funding/ liquidity risk	✓	✓	✓	✓
	Loan growth	✓			
	Real estate/ housing markets	✓		✓	✓
	Credit risk/ loan quality	✓	✓	✓	✓
	Lending standards		✓		✓
Corp. & households	Corporate sector	✓	✓	✓	
	Household	✓	✓	✓	✓
NBFIs	Aggregate (usually by risk factors)	✓	✓	✓	✓
	Breakdowns (by institutions)				
Financial markets	Bond market (Govt. and corporate)	✓	✓	✓	
	Equity market		✓	✓	
	Interbank/ money market	✓	✓	✓	
	FX/ currency market				
I/connected ness	International banks				✓
	Domestic banks				
	Conglomerates / SIFIs				
	Government exposures				
Agg. Ratios/ FSIs	Tables				
	Charts	*	✓	*	*

For coverage of aggregate banking ratios or FSIs, a 'half-check (*)' is given if the ratios or graphs presented do not cover all four groups of indicators; liquidity, profitability, capital adequacy and credit quality.

For the diagram on coverage of systemic risk, an FSR is said to have least coverage if the number of checks for a particular year is less than 9.5, moderate coverage if the number of checks is between 9.5 to 12, and greatest if it exceeds 12.

The methodology for assessing forward-looking analysis in the FSRs follows similar steps to the assessment of systemic risk coverage. Nonetheless, some minor adjustments were made in the broad categories of systemic risks. For the assessment of forward-looking analysis, only four broad categories were applied. The aggregate banking indicators or FSIs were not included, given that the ratios provide a historical perspective rather than a forward-looking one. Additionally, interconnectedness in the domestic financial system was also dropped, given the minimal coverage in most of the FSRs. Stress testing results were also excluded. For the purpose of forward-looking analysis, a check is given if, for each sub-category, there is at least a statement that provides some form of forecast, expectation, outlook or probability of a potential situation materializing.

For the diagram on forward-looking analysis, an FSR is said to have least coverage if the number of checks for a particular year is less than 3, moderate coverage if the number of checks is 3 or 4, and greatest coverage if it exceeds 4.

Five criteria or questions were used to assess how the results of stress tests were reported in the eight countries' FSRs from 2008 to 2011. For each question, a response of 'yes' gets a value of 1, while a 0 is assigned to a 'no.'

i. **Assumptions**: Are the assumptions of the stress tests included whenever the results of a stress test are reported?

ii. **Graphical presentation of results**: In addition to explaining qualitatively the stress test results, does the reporting of the stress test results include any graphical presentations, either as a diagram or in a table?

iii. **Granular results**: Do the FSRs report stress test result beyond the aggregated level i.e. is there some degree of granularity, such as the number of institutions, percentage of banks, etc..?

iv. **Methodology provided**: Is the methodology of the stress tests explained in the FSR?

v. **Text instead of a box**: Are the results to the stress tests reported as part of regular text of the report or the analysis is reported instead in a special box?

APPENDIX V. ADDITIONAL EMPIRICAL RESULTS

Appendix Table 1. Probability of a Banking Crisis (Probit model)
(estimation period: 2000–2009)

	Dependent variable: Banking crisis 1/											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Control variables:												
M2 to reserves (t-1)	0.026***	0.023***	0.025***	0.026***	0.027***	0.027***	0.025***	0.027***	0.025***	0.025***	0.023***	0.025***
	(0.008)	(0.007)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.009)	(0.008)	(0.008)
Depreciation	0.037*	0.038**	0.038*	0.036*	0.035*	0.035*	0.037*	0.037*	0.037*	0.036*	0.035	0.038*
	(0.020)	(0.019)	(0.021)	(0.021)	(0.020)	(0.019)	(0.020)	(0.021)	(0.020)	(0.022)	(0.023)	(0.021)
Real GDP growth (t-1)	-0.006	0.010	0.001	-0.030	-0.001	0.018	-0.012	-0.012	0.009	-0.042	-0.058	-0.000
	(0.078)	(0.074)	(0.077)	(0.082)	(0.077)	(0.073)	(0.079)	(0.079)	(0.075)	(0.087)	(0.089)	(0.077)
Growth of private credit over GDP (t-1)	1.968**	1.005	1.797**	2.229***	2.051**	1.551**	2.025**	2.125**	1.639**	2.019**	1.955**	1.741**
	(0.836)	(0.671)	(0.785)	(0.856)	(0.812)	(0.747)	(0.834)	(0.865)	(0.802)	(0.887)	(0.891)	(0.819)
Credit-to-deposit ratio (t-1)	1.524***	1.573***	1.496***	1.577***	1.508***	1.439***	1.552***	1.493***	1.509***	1.664***	1.688***	1.496***
	(0.461)	(0.454)	(0.459)	(0.482)	(0.463)	(0.444)	(0.468)	(0.463)	(0.452)	(0.529)	(0.523)	(0.459)
Cost-to-income ratio (t-1)	1.413*	1.208*	1.517**	1.443*	1.503**	1.382**	1.457*	1.484**	1.295*	1.836*	1.434*	1.501*
	(0.722)	(0.654)	(0.768)	(0.759)	(0.721)	(0.664)	(0.745)	(0.748)	(0.669)	(0.957)	(0.807)	(0.778)
Governance index (t-1) 2/	-0.397	-0.366	-0.205	-0.557	-0.434	-0.371	-0.449	-0.436	-0.308	-0.776*	-0.728	-0.186
	(0.408)	(0.399)	(0.402)	(0.430)	(0.400)	(0.386)	(0.413)	(0.413)	(0.398)	(0.468)	(0.457)	(0.410)
FSR quality ratings:												
Composite quality rating 3/	-1.413***											
	(0.499)											
Aims		-0.418*									0.958*	
		(0.244)									(0.524)	
Overall analysis			-1.519***									-1.693*
			(0.535)									(0.866)
Issues				-1.369***							-3.837***	
				(0.414)							(1.486)	
Tools					-1.659***						2.434	
					(0.550)						(1.629)	
Structure						-1.141**						0.213
						(0.510)						(0.810)
Clarity							-1.514***			-2.539		
							(0.511)			(4.521)		
Consistency								-1.413***		-2.373		
								(0.485)		(4.046)		
Coverage									-1.163**	3.895**		
									(0.500)	(1.955)		
Constant	-2.299*	-4.237***	-2.096	-2.086	-1.784	-2.478*	-2.134	-2.578*	-2.493*	-4.540	-3.012*	-2.180
	(1.392)	(1.203)	(1.452)	(1.346)	(1.410)	(1.437)	(1.405)	(1.346)	(1.432)	(2.881)	(1.554)	(1.512)
Number of observations	194	194	194	194	194	194	194	194	194	194	194	194
R2	0.452	0.406	0.454	0.483	0.453	0.418	0.460	0.462	0.424	0.499	0.513	0.455
Model X^2	58.181	52.209	58.458	62.131	58.294	53.766	59.186	59.515	54.614	64.279	66.073	58.528

note: *** p<0.01, ** p<0.05, * p<0.1.

1/ As defined in Laeven and Valencia (2010). The dependent variable takes a value of unity if there is a crisis and zero otherwise.

2/ Weighted average of the 6 governance indicators produced by Kaufman, Kraay and Mastruzzi, which cover voice and accountability, political stability, government effectiveness, regulatory quality, rule of law and control of corruption. Higher values indicate better governance.

3/ Weighted average of the ratings of the individual elements and characteristics.

Appendix Table 2. Moody's Bank Financial Strength Rating (GLS panel model)
(estimation period: 2000–2009)

	Dependent variable: Moody's BFSR 1/											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Control variables:												
M2 to reserves (t-1)	0.0001	0.0001	0.0001	0.0001	0.0003	0.0004	0.0001	0.0001	0.0002	0.0000	0.0004	0.0005
	0.0006	0.0007	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006	0.0006
Depreciation	0.0002	0.0003	0.0000	0.0001	-0.0000	-0.0000	0.0001	0.0002	0.0003	0.0002	-0.0004	-0.0000
	0.0009	0.0009	0.0009	0.0009	0.0008	0.0008	0.0009	0.0009	0.0009	0.0009	0.0009	0.0008
Real GDP growth (t-1)	-0.005	-0.005	-0.005	-0.005	-0.005	-0.005	-0.005	-0.005	-0.005	-0.004	-0.005	-0.005
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Growth of private credit over GDP (t-1)	0.083	0.020	0.071	0.093	0.125**	0.139**	0.085	0.084	0.075	0.071	0.126**	0.142**
	(0.057)	(0.053)	(0.053)	(0.056)	(0.058)	(0.058)	(0.057)	(0.056)	(0.057)	(0.057)	(0.058)	(0.058)
Credit-to-deposit ratio (t-1)	0.085**	0.086**	0.089**	0.087**	0.082**	0.076**	0.086**	0.087**	0.081**	0.093**	0.082**	0.074**
	(0.037)	(0.038)	(0.037)	(0.037)	(0.037)	(0.036)	(0.037)	(0.037)	(0.037)	(0.038)	(0.037)	(0.037)
Cost-to-income ratio (t-1)	0.101**	0.100**	0.103**	0.104**	0.108**	0.110**	0.102**	0.102**	0.100**	0.100**	0.115**	0.111**
	(0.048)	(0.050)	(0.048)	(0.048)	(0.047)	(0.047)	(0.048)	(0.048)	(0.049)	(0.049)	(0.047)	(0.047)
Governance index (t-1) 2/	-0.214***	-0.224***	-0.205***	-0.220***	-0.214***	-0.213***	-0.216***	-0.214***	-0.214***	-0.213***	-0.217***	-0.215***
	(0.033)	(0.033)	(0.033)	(0.032)	(0.032)	(0.031)	(0.032)	(0.033)	(0.033)	(0.032)	(0.032)	(0.033)
FSR quality ratings:												
Composite quality rating 3/	-0.101**											
	(0.040)											
Aims		-0.016									0.042	
		(0.022)									(0.034)	
Overall analysis			-0.106***									0.017
			(0.039)									(0.062)
Issues				-0.091***							0.015	
				(0.033)							(0.115)	
Tools					-0.179***						-0.260*	
					(0.052)						(0.158)	
Structure						-0.202***						-0.223**
						(0.053)						(0.087)
Clarity							-0.108***			0.020		
							(0.042)			(0.250)		
Consistency								-0.092***		-0.154		
								(0.035)		(0.215)		
Coverage									-0.099**	0.067		
									(0.044)	(0.122)		
Constant	0.795***	0.623***	0.806***	0.786***	0.957***	1.040***	0.805***	0.753***	0.818***	0.672***	1.024***	1.051***
	(0.103)	(0.077)	(0.103)	(0.095)	(0.123)	(0.134)	(0.105)	(0.089)	(0.120)	(0.187)	(0.153)	(0.138)
Number of observations	104	104	104	104	104	104	104	104	104	104	104	104
R2	0.66	0.65	0.65	0.66	0.67	0.67	0.66	0.66	0.65	0.67	0.68	0.67
Model X^2	90.649	81.382	92.088	92.331	100.143	104.240	91.019	91.660	89.447	94.788	105.165	102.074

note: *** p<0.01, ** p<0.05, * p<0.1.

1/ Moody's Bank Financial Strength Rating (BSFS): a weighted average of the financial strength ratings of the individual banks that are rated by Moody's in the country. The individual bank ratings are weighted in the composite rating by the banks' total assets and the composite letter rating is mapped into a numerical index with higher values assigned to lower ratings and vice versa. Thus, higher index values imply more fragile banking systems.

2/ Weighted average of the 6 governance indicators produced by Kaufman, Kraay and Mastruzzi, which cover voice and accountability, political stability, government effectiveness, regulatory quality, rule of law and control of corruption. Higher values indicate better governance.

3/ Weighted average of the ratings of the individual elements and characteristics.

Appendix Table 3. Stock Market Volatility (GLS panel)
(estimation period: 2000–2009)

	Dependent variable: Stock market volatility 1/											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Control variables:												
M2 to reserves (t-1)	0.015	0.015	0.012	0.014	0.023	0.030	0.015	0.015	0.017	0.005	0.019	0.027
	(0.049)	(0.049)	(0.049)	(0.049)	(0.048)	(0.049)	(0.049)	(0.049)	(0.049)	(0.049)	(0.047)	(0.050)
Depreciation	0.511***	0.522***	0.507***	0.505***	0.499***	0.501***	0.508***	0.512***	0.515***	0.495***	0.490***	0.500***
	(0.074)	(0.075)	(0.073)	(0.073)	(0.073)	(0.073)	(0.074)	(0.074)	(0.074)	(0.074)	(0.073)	(0.073)
Real GDP growth (t-1)	-1.105***	-1.025***	-1.128***	-1.128***	-1.140***	-1.125***	-1.113***	-1.104***	-1.088***	-1.102***	-1.138***	-1.136***
	(0.322)	(0.324)	(0.320)	(0.319)	(0.318)	(0.318)	(0.321)	(0.321)	(0.323)	(0.321)	(0.314)	(0.319)
Growth of private credit over GDP (t-1)	3.387	-1.239	3.440	4.791	5.989	5.695	3.877	3.468	2.347	3.178	4.766	5.818
	(4.073)	(3.743)	(3.838)	(4.050)	(4.137)	(4.125)	(4.062)	(4.031)	(4.109)	(4.129)	(3.967)	(4.162)
Credit-to-deposit ratio (t-1)	4.918*	4.646*	5.117*	5.140*	4.849*	4.578*	5.025*	5.019*	4.633*	5.784**	4.768*	4.898*
	(2.777)	(2.763)	(2.760)	(2.761)	(2.747)	(2.754)	(2.774)	(2.774)	(2.783)	(2.828)	(2.613)	(2.804)
Cost-to-income ratio (t-1)	1.800	1.095	2.008	2.119	2.643	2.734	1.950	1.890	1.510	2.360	3.288	2.690
	(3.086)	(3.105)	(3.070)	(3.067)	(3.073)	(3.086)	(3.082)	(3.086)	(3.094)	(3.087)	(3.067)	(3.091)
Governance index (t-1) 2/	-5.999***	-6.406***	-5.440**	-6.301***	-5.967***	-5.878***	-6.064***	-5.988***	-5.974***	-6.904***	-6.818***	-5.723***
	(2.123)	(2.101)	(2.137)	(2.093)	(2.091)	(2.098)	(2.113)	(2.118)	(2.135)	(2.174)	(2.006)	(2.172)
FSR quality ratings:												
Composite quality rating 3/	-5.544**											
	(2.789)											
Aims		-0.006									6.388***	
		(1.523)									(2.348)	
Overall analysis			-6.816**									-2.204
			(2.745)									(4.307)
Issues				-5.868***							-12.261	
				(2.242)							(7.890)	
Tools					-10.370***						-0.496	
					(3.546)						(10.473)	
Structure						-10.323***						-8.208
						(3.642)						(5.715)
Clarity							-6.354**			-27.617		
							(2.872)			(23.415)		
Consistency								-5.059**		8.132		
								(2.420)		(20.489)		
Coverage									-4.634	13.364		
									(3.086)	(9.236)		
Constant	42.231***	31.884***	45.019***	43.701***	52.285***	54.010***	43.641***	40.050***	41.862***	40.993***	49.233***	53.555***
	(7.005)	(5.019)	(7.018)	(6.443)	(8.375)	(9.098)	(7.078)	(6.050)	(8.170)	(15.537)	(9.665)	(9.286)
Number of observations	190	190	190	190	190	190	190	190	190	190	190	190
R2	0.34	0.33	0.35	0.35	0.36	0.36	0.34	0.34	0.34	0.36	0.42	0.36
Model X^2	107.41	100.70	110.84	111.99	114.64	113.83	108.92	108.06	104.63	112.18	124.02	114.04

note: *** p<0.01, ** p<0.05, * p<0.1.

1/ 360-day stock market index volatility measured in standard deviations.

2/ Weighted average of the 6 governance indicators produced by Kaufman, Kraay and Mastruzzi, which cover voice and accountability, political stability, government effectiveness, regulatory quality, rule of law and control of corruption. Higher values indicate better governance.

3/ Weighted average of the ratings of the individual elements and characteristics.

Appendix Table 4. Sovereign Financial Risk Ratings (GLS panel)
(estimation period: 2000–2009)

	Dependent variable: ICRG Sovereign financial risk rating 1/											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Control variables:												
M2 to reserves (t-1)	-0.020	-0.019	-0.020	-0.020	-0.020	-0.020	-0.019	-0.020	-0.020	-0.021	-0.019	-0.020
	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)
Depreciation	-0.013	-0.016	-0.012	-0.013	-0.012	-0.012	-0.012	-0.013	-0.014	-0.018	-0.016	-0.012
	(0.021)	(0.021)	(0.021)	(0.021)	(0.021)	(0.021)	(0.021)	(0.021)	(0.021)	(0.022)	(0.021)	(0.021)
Real GDP growth (t-1)	-0.188**	-0.189**	-0.189**	-0.189**	-0.189**	-0.189**	-0.188**	-0.188**	-0.187**	-0.189**	-0.189**	-0.189**
	(0.093)	(0.093)	(0.093)	(0.093)	(0.093)	(0.093)	(0.093)	(0.093)	(0.093)	(0.094)	(0.093)	(0.093)
Growth of private credit over GDP (t-1)	-0.927	-0.889	-0.668	-0.711	-0.674	-0.690	-0.853	-0.954	-0.929	-0.875	-1.006	-0.734
	(1.457)	(1.411)	(1.420)	(1.446)	(1.452)	(1.444)	(1.455)	(1.453)	(1.454)	(1.459)	(1.475)	(1.450)
Credit-to-deposit ratio (t-1)	-3.869***	-3.807***	-3.910***	-3.905***	-3.893***	-3.877***	-3.886***	-3.875***	-3.832***	-3.770***	-3.798***	-3.916***
	(1.110)	(1.110)	(1.110)	(1.109)	(1.111)	(1.110)	(1.110)	(1.108)	(1.112)	(1.112)	(1.130)	(1.116)
Cost-to-income ratio (t-1)	-1.448	-1.426	-1.426	-1.440	-1.443	-1.448	-1.445	-1.457*	-1.439	-1.464	-1.430	-1.433
	(0.882)	(0.880)	(0.883)	(0.884)	(0.885)	(0.885)	(0.883)	(0.882)	(0.882)	(0.890)	(0.883)	(0.886)
Governance index (t-1) 2/	1.753*	1.841*	1.831*	1.911*	1.916*	1.886*	1.812*	1.725	1.740	1.635	1.809*	1.834*
	(1.063)	(1.014)	(1.077)	(1.041)	(1.059)	(1.057)	(1.060)	(1.058)	(1.065)	(1.043)	(1.096)	(1.089)
FSR quality ratings:												
Composite quality rating 3/	1.468											
	(1.294)											
Aims		0.962									1.190	
		(0.705)									(1.027)	
Overall analysis			1.115									0.802
			(1.303)									(2.240)
Issues				0.887							-1.588	
				(1.065)							(4.356)	
Tools					1.153						2.039	
					(1.562)						(5.686)	
Structure						1.232						0.462
						(1.530)						(2.638)
Clarity							1.378			-6.731		
							(1.353)			(7.123)		
Consistency								1.408		5.801		
								(1.162)		(5.617)		
Coverage									1.514	1.566		
									(1.314)	(3.773)		
Constant	40.143***	41.609***	40.830***	41.152***	40.714***	40.347***	40.344***	40.535***	39.724***	42.499***	40.550***	40.448***
	(3.152)	(2.023)	(3.201)	(2.933)	(3.717)	(3.871)	(3.243)	(2.739)	(3.429)	(4.294)	(4.633)	(3.926)
Number of observations	194	194	194	194	194	194	194	194	194	194	194	194
R2	0.08	0.07	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.10	0.07	0.08
Model X^2	26.304	26.927	25.644	25.579	25.429	25.525	26.020	26.482	26.345	26.991	27.056	25.611

note: *** p<0.01, ** p<0.05, * p<0.1.

1/ The International Country Risk Guide (ICRG) sovereign financial risk rating measures a country's ability to finance its official, commercial, and trade debt obligations. Lower values indicate higher risk.

2/ Weighted average of the 6 governance indicators produced by Kaufman, Kraay and Mastruzzi, which cover voice and accountability, political stability, government effectiveness, regulatory quality, rule of law and control of corruption. Higher values indicate better governance.

3/ Weighted average of the ratings of the individual elements and characteristics.

Appendix Table 5. Moody's Expected Default Frequency (GLS panel)
(estimation period: 2000–2009)

	Dependent variable: Moody's 1-year median banking system EDF 1/											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Control variables:												
M2 to reserves (t-1)	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Depreciation	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.010	0.012
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
Real GDP growth (t-1)	0.011	0.013	0.012	0.009	0.008	0.008	0.010	0.010	0.012	0.019	0.013	0.016
	(0.041)	(0.040)	(0.041)	(0.040)	(0.040)	(0.040)	(0.041)	(0.040)	(0.041)	(0.042)	(0.041)	(0.041)
Growth of private credit over GDP (t-1)	-0.191	-0.231	-0.194	-0.147	-0.118	-0.106	-0.179	-0.185	-0.211	-0.179	-0.117	-0.089
	(0.277)	(0.247)	(0.260)	(0.278)	(0.304)	(0.303)	(0.279)	(0.275)	(0.278)	(0.300)	(0.301)	(0.311)
Credit to deposit ratio (t-1)	-0.196	-0.198	-0.195	-0.181	-0.177	-0.181	-0.193	-0.195	-0.194	-0.075	-0.061	-0.179
	(0.205)	(0.200)	(0.207)	(0.212)	(0.210)	(0.207)	(0.207)	(0.207)	(0.203)	(0.271)	(0.237)	(0.214)
Cost-to-income ratio (t-1)	-0.406	-0.374	-0.416	-0.396	-0.382	-0.370	-0.404	-0.407	-0.403	-0.369	-0.169	-0.380
	(0.386)	(0.383)	(0.392)	(0.390)	(0.398)	(0.402)	(0.387)	(0.388)	(0.384)	(0.424)	(0.428)	(0.408)
Governance index (t-1) 2/	-0.167	-0.161	-0.169	-0.173	-0.176	-0.175	-0.168	-0.167	-0.166	-0.204	-0.193	-0.191
	(0.145)	(0.142)	(0.144)	(0.147)	(0.147)	(0.146)	(0.145)	(0.145)	(0.143)	(0.165)	(0.145)	(0.153)
FSR quality ratings:												
Composite quality rating 3/	0.014											
	(0.176)											
Aims		0.039									0.222	
		(0.087)									(0.189)	
Overall analysis			0.025									0.162
			(0.195)									(0.295)
Issues				-0.027							-0.413	
				(0.147)							(0.518)	
Tools					-0.074						0.138	
					(0.257)						(0.628)	
Structure						-0.090						-0.250
						(0.259)						(0.389)
Clarity							0.001			-0.641		
							(0.186)			(1.596)		
Consistency								0.007		0.183		
								(0.157)		(1.379)		
Coverage									0.037	0.439		
									(0.186)	(0.740)		
Constant	1.059*	1.003**	1.034*	1.136**	1.217*	1.258*	1.085*	1.074**	0.998	0.898	1.119	1.233*
	(0.576)	(0.496)	(0.601)	(0.537)	(0.654)	(0.679)	(0.577)	(0.525)	(0.647)	(1.191)	(0.725)	(0.696)
Number of observations	98	98	98	98	98	98	98	98	98	98	98	98
R2	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.18	0.17
Model X^2	17.230	17.910	17.090	17.091	17.060	17.104	17.185	17.182	17.352	16.093	19.131	16.622

note: *** p<0.01, ** p<0.05, * p<0.1.

1/ Banking system median default probability, measured as MKMV's 1-year Expected Default Frequency (EDF).

2/ Weighted average of the 6 governance indicators produced by Kaufman, Kraay and Mastruzzi, which cover voice and accountability, political stability, government effectiveness, regulatory quality, rule of law and control of corruption. Higher values indicate better governance.

3/ Weighted average of the ratings of the individual elements and characteristics.

REFERENCES

Blinder, A. S., Ehrmann, M., Fratzscher,M., De Haan, J., and D-J Jansen, 2008, "Central Bank Communication and Monetary Policy: A Survey of Theory and Evidence", *Journal of Economic Literature*, vol. 46(4), pp. 910–45.

Bologna, P., 2011, "Is There a Role for Funding in Explaining Recent U.S. Banks' Failures?", IMF Working Paper No. 11/180 (Washington: International Monetary Fund).

Born, B., Ehrmann,M. and M. Fratzscher, 2011, "Central Bank Communication on Financial Stability", ECB Working Paper No. 1332 (Frankfurt: European Central Bank).

Clatworthy, Mark and Michael Jones, 2001, "The effect of thematic structure on the variability of annual report readability," *Accounting, Auditing & Accountability Journal*, Vol. 14, No. 3, pp. 311–326.

Čihák, M., 2006, "How Do Central Banks Write on Financial Stability?", IMF Working Paper No. 06/163 (Washington: International Monetary Fund).

Čihák, M., S. Muñoz, and R. Scuzzarella, 2011, "The Bright and the Dark Side of Cross-Border Banking Linkages," IMF Working Paper No. 11/186 (Washington: International Monetary Fund).

Demirgüç-Kunt, A., and E. Detragiache, 2005, "Cross-Country Empirical Studies of Systemic Bank Distress: A Survey", IMF Working Paper No. 96.

Fracasso, F., Genberg, H. and C. Wyplosz, 2003, "How do Central Banks Write? An Evaluation of Inflation Reports by Inflation Targeting Central Banks", Geneva Reports on the World Economy, Special Report 2.

Garcia Herrero, A., del Rio, P., 2005, "Financial Stability and the Design of Monetary Policy", Banco de España Working Paper, No. 0315 (Madrid: Banco de España).

Goodhart, C. and J-C. Rochet, 2011, Evaluation of the Riksbank's Monetary Policy and Work with Financial Stability 2005–2010, Reports from the Riksdag 2010/11: RFR5, The Committee on Finance.

Haldane, A., Hall, S. and S. Pezzini, 2007, "A New Approach to Assessing Risks to Financial Stability", Bank of England Financial Stability Paper No. 2 (London: Bank of England).

Hallvarsson and Hallvarsson, 2010, "Communication From the Major Banks and Authorities During the Financial Crisis, 2007- 1 July 2009," 20 September 2010.

Heckman, J., 1979, "Sample Selection Bias as a Specification Error", *Econometrica,* vol.47 (1), pp. 153–61.

Houben, A., Kakes, J., and G. Schinasi, 2004, "Towards a Framework for Financial Stability", Occasional Study, vol. 2 (Amsterdam: De Nederlandsche Bank).

IMF, 2011, “Macroprudential Policy Objectives and Tools: Lessons from Country Experiences,” September, (Washington: International Monetary Fund).

J.P. Morgan Research, “Central Bank Communication Hits Diminishing Marginal Returns” May 11, 2007.

Kaminsky, G.L., and C. Reinhart, 1999, “The Twin Crises: The Causes of Banking and Balance-of-Payments Problems”, *American Economic Review,* No. 89 (3), pp. 473–500.

Kaufmann, D., Kraay A. and M. Mastruzzi, 2010, “The Worldwide Governance Indicators: Methodology and Analytical Issues”, World Bank Policy Research Working Paper 5430.

Kincaid J., R. Fishburne, R. Rogers, and B. Chissom, 1975, “Derivation of new readability formulas (Automated Readability Index, Fog Count, and Flesch Reading Ease Formula) for Navy enlisted personnel.” Research Branch report 8-75. (Memphis: Naval Air Station.)

Laeven, L. and F. Valencia, 2008, “Systemic Banking Crises: A New Database,” IMF Working Paper 08/224.

_____, 2010, “Resolution of Banking Crises: The Good, the Bad, and the Ugly,” IMF Working Paper 10/146.

Merton, R.C., 1973, “On the Pricing of Corporate Debt: The Risk Structure of Interest Rates”, prepared for the *American Finance Association Meetings*, New York, December 1973.

Nier, E., 2005, “Bank stability and transparency”, *Journal of Financial Stability*, No. 2, pp. 342–54.

Oosterloo, S., J. de Haan, and R. Jong-A-Pin, 2007, "Financial Stability Reviews: A First Empirical Analysis", *Journal of Financial Stability*, No. 2, pp. 337–355.

Schinasi, G., 2003, "Responsibility of Central Banks for Stability in Financial Markets", IMF Working Paper No. 03/121 (Washington: International Monetary Fund).

_____, 2006, Safeguarding Financial Stability: Theory and Practice (Washington: International Monetary Fund).