Financial Surveillance and Communication: Recent and Future Challenges from the Chilean Experience[1]

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Introduction

The Central Bank of Chile (BCCH) published its first Financial Stability Report (FSR) in 2004, more than a decade ago. A few years later, Čihák (2006) commented on Chile's FSRs[2], indicating that Chile's FSRs were found to have a number of important strengths, such as clear presentation, clarity of aims, regular use of stress tests, role in central bank's activities, and the articles included at the end of the report which "…provide excellent analytical insights into topics of interest for both the BCCh [BCCH] and outside readers". The Chilean FSRs were compared favorably with reports published by other emerging market central banks.

However, in the evaluation, interesting suggestions were also provided. In particular, the author indicated that the following items could help enhance the BCCH's reports: (1) providing an operational definition of financial stability; (2) providing stress test results as time series; (3) integrating market risks, credit risks, and contagion risks; (4) presenting more analysis based on disaggregate data; and (5) making the underlying data and definitions more transparent to readers. Additionally, there were suggestions regarding the structure of the report.

Several changes have been made since 2006, some in line with these suggestions. Among these, the continuous development of the stress tests, the use of disaggregated data –which also implied joining efforts with other areas of the BCCH and other supervisory agencies– and providing more information to the readers regarding the data itself and methodologies used in the analysis. The structure and timing of the report also has undergone a number of changes, particularly since the global financial crisis (GFC), in order to simplify and highlight main messages after the crisis.

The BCCH formally started asking the FSR readers about their opinion of the report in 2008. A short survey is given to external analysts attending the FSR in-door presentation each semester. The results of this semi-annual survey have not changed much through time: overall, analysts think that the FSR is a useful tool for their jobs, which analysis is delivered with appropriate depth and clarity. Nonetheless, the surveyed subjects reporting to "always read" the report have decreased in favor of "read [the report] most of the time". Among their suggestions for improving the FSR, the typical ones relate to use more data, more graphs and simpler analysis, as well as those asking for the balance of risks to be clearer. These suggestions are somewhat in line with the general view of Čihák et al. (2012) for the FSRs of a selected group of economies, and the evaluation of FSR by Latin-American and Caribbean countries by Lim et al. (2017).

Čihák et al. (2012) indicate that FSRs "…should aim to limit financial instability by pointing out key risks and vulnerabilities to policy makers, market participants and the public at large", reminding that FSR communication reduces market volatility (Born et al., 2011). In their evaluation, the authors find that FSR messages could improve in clarity, coverage of risks, and consistency over time, and adopt a more forward

[1] Presented at the International Monetary Fund´s Workshop on Financial Surveillance and Communication: Best Practices from Latin America, Caribbean, and Advanced Economies, held at IMF HQ on June 27th 2017. The views are those of the authors and do not correspond necessarily to the official position of the Central Bank of Chile.

[2] For more details of the original assessment, see the Appendix.

looking approach. Lim et al. (2017) recall the relevance of FSRs as communication tools that could help the public better understand the financial system. FSRs can also help to "…build credibility and confidence in the authorities' surveillance role and policy framework".

In this paper we selectively review the BCCH's experience on financial stability monitoring and communication, and present some future challenges. Over the following sections, we present a selected number of issues that have been pinpointed in past FSRs. Then, we discuss the broad contours of the top-down stress-test methodology used at the BCCH. Finally, we highlight the recent comparative assessment by IMF Staff of the BCCH's FSR, which present some useful directions for future improvement.

1. Some examples of financial stability monitoring and communication

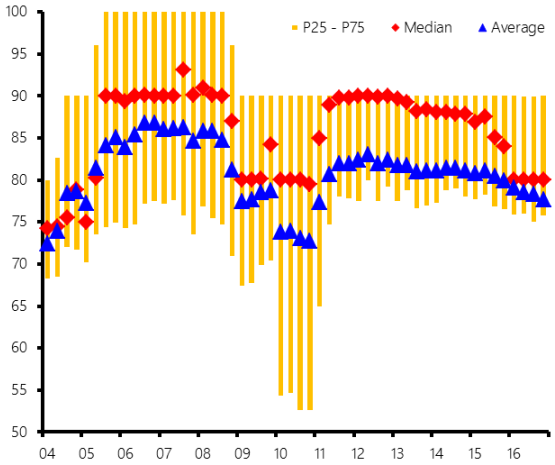
Over the years, domestic and international developments have led the BCCH to highlight the potential for financial stability risks in a number of areas. Some of these have been common to overall developments in advanced economies, such as the role of housing markets and mortgage origination standards. Figure 1 shows how house prices have presented a steady increase since data is available, about 15 years ago. Two episodes of slowdown are apparent, namely the spillovers from the global crisis in 2009, and more recently a deceleration since early 2016. As is also apparent the cycle of house prices has coincided with fluctuations in loan-to-value (LTV) ratios in mortgage products originated in the banking system. For instance, right before the GFC, 75% or mortgages had LTV ratios 75% or higher, with a median of 90%. As the crisis hit and global credit conditions tightened, this also showed up in domestic markets. Not only house prices stopped rising but also a sharp reduction in LTV ratios took place. The median of the distribution fell to 80% but the 25th percentile of the distribution fell dramatically to close to 50%. The subsequent business-cycle recovery did loosen up quite rapidly credit origination standards, probably showing that no lasting damage was inflicted to household's or bank's balance sheets. Domestic policy reaction plus the rebound in commodity prices are probably behind this quick recovery.

More recently, another tightening in LTV ratios is quite visible since early 2016. Three dimensions are worth noting here. First, the shift has not been for the whole distribution. Although the median has clearly fallen, the 25th percentile of LTV remains at around 75%. Second, the macroeconomic business cycle undoubtedly became more challenging over the past several years compared to the heyday of the super cycle of commodities. It would be expected, and also desirable, that as this change proceeded credit conditions also reflect it in the mortgage market. Third, the bank supervisory agency implemented a change in the provision policy it applies to banks by making more onerous to provision non-performing mortgage loans with over 80% LTV ratios.

Apart from the interpretation of recent developments, from the perspective of the BCCH a few key points are worth highlighting. As could be derived from some of the points made earlier, it is desirable that the overall credit dynamics follow the actual fundamentals that drive the business cycle. Otherwise, monetary policy could find itself in a quandary: faced with a slowing macroeconomy but a booming credit market, the tradeoffs for interest rate policy setting become very acute. This has not been the case. The availability of microeconomic data has also been critical to see how the overall distribution of credit indicators (in this case LTV ratios) evolve over time. This is always an ongoing work, and notably apart from anecdotal evidence the froth in mortgage origination pre GFC was not visible to the BCCH. Data construction, particularly in this case on house prices, has also been a permanent part of the agenda. In our case, the BCCH data is essentially a census, but that has the caveat that the timeliest entries are subject to significant revisions. Thus, it is quite key to rely on other sources of information, in this case from the Business Construction Association (CChC).

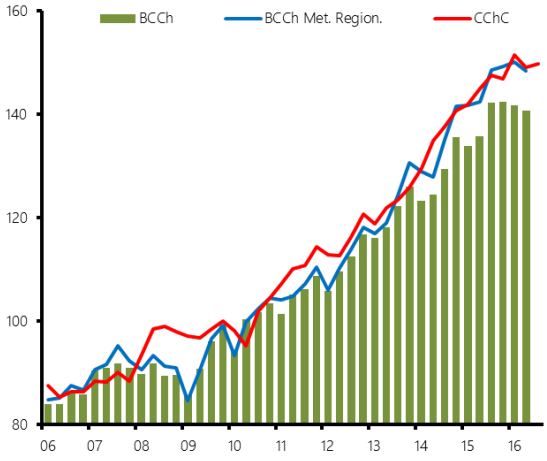
Figure 1 – Mortgage Origination and House Prices

Distribution of LTV ratios (percent)



Source: BCCh with SII data

House prices (index in real terms, 2010=100)



Source: BCCh and CChC

A second noteworthy financial stability issue, highlighted by the IMF and other international bodies for a number of emerging economies, is corporate leverage and the risk of un-hedged foreign exchange exposures. Figure 2 shows how corporate leverage, measured as a % of GDP, has increased over time in Chile. The breakdown in structure shows that the bulk of the most upward trend since the GFC has been in FDI related to foreign borrowing and the issuance of foreign bonds. The corporate leverage linkage to financial stability can be assessed on a number of angles. First, evidently a high debt burden can pose a direct credit risk exposure to those intermediaries holding the liabilities. As Figure 2 shows, the local banks and local investors hold a sizeable fraction of the total corporate liabilities. This risk can be accentuated if the same corporates that have issued foreign liabilities have also issued debt locally. That is, if the apparent structure in Figure 2 corresponds to a representative firm.

This analysis has been highlighted in several FSRs. The main takeaways from it are that corporate issuers of debt held by banks are firms that are a. less likely to depend on foreign borrowing, and b. more likely to be smaller firms without access to capital markets, and of local ownership. By the same vein, larger firms are a. more likely to access capital markets and issue liabilities abroad, and b. foreign-owned. This is an important characterization that is possible to construct thanks to data availability and appropriate institutional coordination both within the BCCH and between the BCCH and other supervisory agencies.

Foreign exchange exposure has been the source of many external and financial crises. Thus it is in the obvious interest of the BCCH to gauge to what extent credit risk from corporate leverage is amplified or triggered by the existence of foreign exchange exposures. Figure 2 shows one measure that we have found particularly useful. It displays the tails of the distribution of net foreign exchange exposures[3] in the corporate sector since the early 2000s. For instance, information for 2001 shows that firms holding more than 40% of total of corporate[4] assets had a net foreign exchange liability exposure higher than 10% of their total assets. Firms that had a net foreign asset exposure higher than 10% of their assets represented less than 10% of total assets in the sector. The evolution over time has been quite significant, and is noteworthy

[3] This considers both foreign denominated assets and liabilities as well as the net foreign exchange derivative exposure.

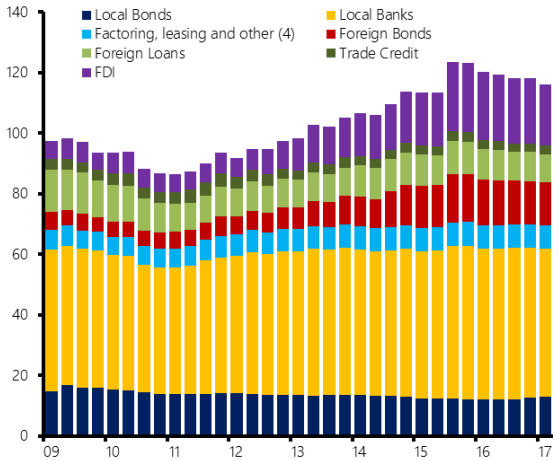
[4] Excluding state-owned, financial and mining corporates.

that since 2013, when the nominal exchange rate experienced a significant depreciation, the net foreign exchange exposure actually strengthened.

This poses a number of important lessons. On monitoring, a key element is data availability. The BCCH has some advantages in that the regulation and supervision of foreign exchange flows falls within its purview. However, a key element has been the fact that notwithstanding the shift to IFRS, the supervisory institutions have maintained that reporting of foreign exchange exposure by non-financial corporates should remain in a standardized form so as to facilitate the assessment of exchange rate risks.

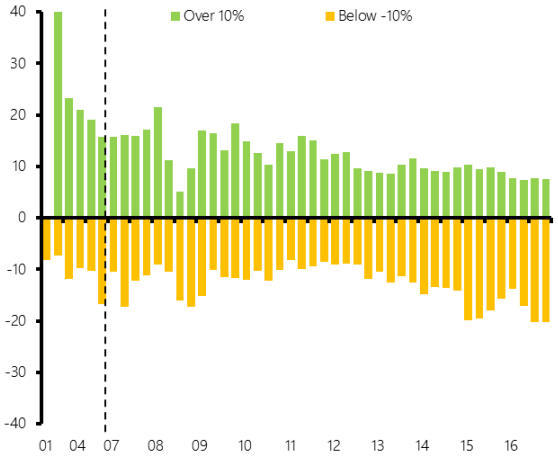
Figure 2 - Corporate Leverage and Foreign Exchange Exposure

Structure of total corporate gross debt (% GDP)



Sources: See FSR 2017 H1

Tails of the net foreign liability exchange exposure distribution in selected corporates (as % of assets)



Sources: See FSR 2017 H1. Yearly data pre-2007, quarterly data thereafter

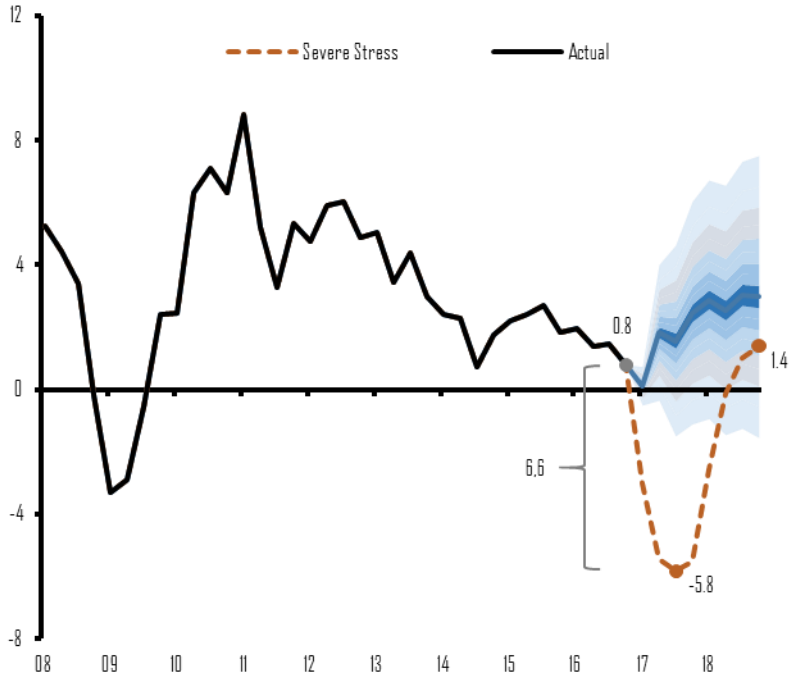
2. Stress testing: methodologies and communication

The construction and communication of stress tests has become a staple of the BCCH's FSR. At the beginning of FSR publication, stress testing was performed on an ad-hoc basis, by the application of specific shocks to individual variables. From 2006 onwards a methodology that encompasses a "severe stress scenario", with simultaneous and large shocks to a broad set of variables has been applied to assess systemic risk. This severe stress scenario is an unlikely, but possible, scenario, representing a large exogenous shock to the macroeconomy that encompasses the most damaging features of past fluctuations seen in Chile. Figure 3 shows the current outcome of a severe stress scenario in GDP growth, comparing it with the fanchart of outcomes derived from the most recent output forecast in the BCCH's Monetary Policy Report.

A useful way to characterize this severe stress scenario is by gauging how it compares to the most recent recessions in Chile. The first one, in 1999, resulted from the combination of a large negative external shock, both to the terms of trade and financial conditions due to the sequence of emerging market crises at the time, and a relatively rigid exchange rate arrangement. This produced a pro-cyclical monetary policy response, as interbank and longer term yields increased significantly whilst the exchange rate remained stable. The second one, in 2009, resulted also from a (larger) external shock, both financial and real, but that interacted with a fully flexible exchange rate arrangement and credible inflation target, allowing for a large depreciation and a sharp fall in interest rates. The severe stress scenario which is applied in our FSRs has both a large depreciation and a large increase in yields, coupled with, as shown, a significant fall in output.

The details of the most recent methodology can be found in Martínez et.al. (2017). The broad structure of the stress testing methodology follows a top-down approach, as shown in Figure 4, given by the institutional arrangements in Chile and the role of the BCCH in systemic risk surveillance.

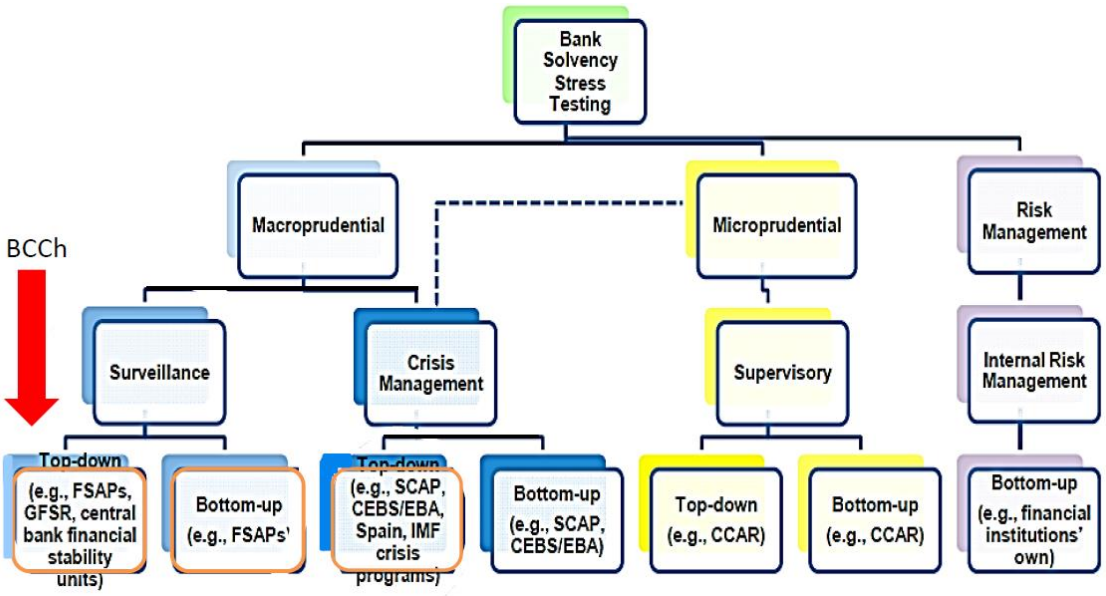
Figure 3 GDP growth under Severe Stress scenario



Source: Central Bank of Chile

Currently the stress testing methodology considers market risk and credit risk applied to every bank of the system. Market risk operates through refinancing and pricing changes in the different components of the banks' balance sheets. Credit risk is estimated by different categories of the credit market (mortgages, commercial, and consumption credit), reflected by the dynamic interaction of aggregated credit growth, loss provisioning, credit standards (measured by LTV ratios and credit spreads), house prices, and unemployment, to the broad macro shocks mentioned above. The overall impact of market and credit risks derived from the severe stress scenario are then applied over time to the balance sheets of individual banks, which is then aggregated and provides a metric of the capital adequacy of the system as a whole and its distribution across banking institutions. This information is then published in the FSRs. Figure 5 presents the most recent estimates.

Figure 4 – Outline of BCCh's stress-test methodology



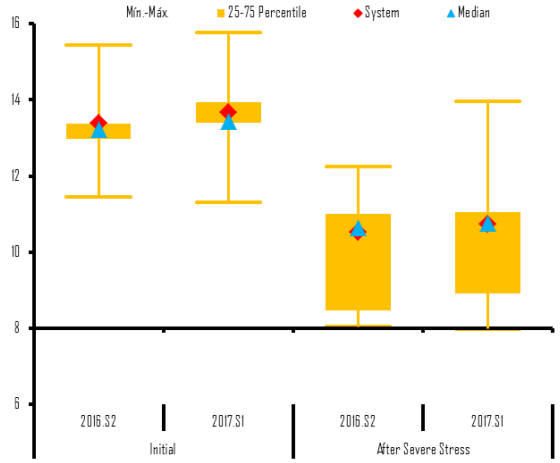
Source: Martínez et.al. (2017) using Jobst et.al. (2013)

On the left panel, the broad parameters of the distribution of capital adequacy ratios (CAR) in the current and most recent FSR are displayed, and a number of results can be gleamed from this. First, the severe stress scenario reduces the average and median CAR by about three percentage points, and this result has not changed significantly from FSR to FSR. Second, the distribution of CARs across the system becomes more uniform, as is apparent from the increased width of the 25-75 percentiles. Finally, the system as a whole remains with a CAR over 8%, the regulatory minimum, while the average or median is above 10%.

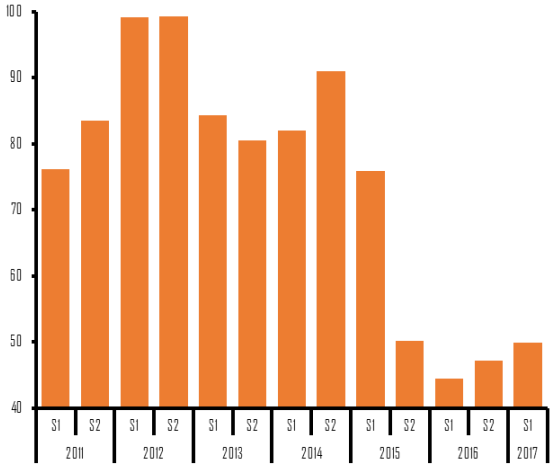
On the right panel a longer timed perspective is offered. This shows the fraction of the banking system assets held by banks that remain, after the severe stress episode, over 10%. It is clear that whereas in 2012-2015 more than 80% of the system (measured by assets) remained over 10%, that fraction has been reduced in a relevant way in more recent times, to around 50%. This has been highlighted in recent FSRs, by stating that although the system as a whole remains resilient in the face of a severe stress scenario, the space to absorb said shocks has clearly diminished. Comparisons with other banking systems, either in the Latin American region or the OECD, show a similar picture as the comparative standing of the system's CAR has slipped over time. From a systemically prudential point of view, this means that efforts to regain larger buffers are warranted, and the BCCH has acknowledged and welcomed the introduction of legal initiatives that aim to get our regulation in line with international standards.

Figure 5 - Impact of Severe Stress Scenarios

Distribution of CAR across banks



Fraction of System Assets with CAR>10% after Severe Stress



Source: Central Bank of Chile

3. The comparative assessment of BCCH's FSR

In their assessment for Latin-America and the Caribbean, Lim et al. (2017) used the methodology proposed by Čihák (2006) to give scores to the FSRs of these countries. It is reinforced that content, quality and transparency are important aspects to consider. The authors find that none of the countries reach the quality standards, which are also found to be very similar to the average quality of emerging markets analyzed in Čihák et al. (2012); note, however, that the score of three out of four Latin-American countries assessed in both studies improved since 2012. Lim et al. (2017) find that the FSRs analyzed vary in terms of quality and coverage, but share one important weakness: the lack of a forward-looking approach in their analysis –hence being more descriptive– and flexibility in their structure that could allow more linkage between topics. Finally, this study suggests several ways to strengthen FSRs in the region, some which are easier to implement than others. The *easy changes* relate to the inclusion of a statement of aims and a definition (general and operational) of financial stability; and to improve the publication (data availability, publication schedule, webpage management). The *hard changes* relate to covering all areas of financial system, a forward looking approach to the identification of risks and opportunities, and the linkage with previous FSRs. This is linked to a more flexible structure of the report that could allow for analysis of particular topics per issue, adequate stress testing, and a proper communication strategy supported by efficient use of visual/digital tools.

Lim et al. (2017) found that Chile's FSR leads the 19 countries assessed with an overall score of 3, which is well above the sample average and also the average for the emerging market group in Čihák et al. (2012). However, breaking down the overall score into the five broad elements assessed according to Čihák's methodology, we find a number of areas of improvement.[5] Noting that 4 is the highest score for an FSR in this methodology, in what follows we will address those areas in which the scores obtained were lower than 3, Chile's overall score.

Generally, Chile's FSR did not score less than 2 in any category. In the area assessing "Aims, Objectives and Reasons", the most items got maximum score. Items with score under 3 were related to the definition of financial stability. Interestingly, the authors consider that this is one of the easy changes a country can

[5] We thank the authors for sending us the scored of each section of the evaluation along with the sample averages of each item.

make. However, the BCCH's experience on this issue shows that it is in fact easier said than done. Defining financial stability operationally might look as an easy task, our Financial Policy Division has worked for some years on each detail of this definition in order not to disrupt or misguide the market in terms of the responsibilities of the BCCH versus the supervisory entities in Chile. Converging to accurate general and operational definitions of financial stability is one of the BCCH´s major FSR-related challenges.

In the area related to the issues covered in the report, according to the authors Chile still lacks clarity in the identification of macro-relevant stability issues, as well as the comprehensiveness of the financial system coverage. One of Chile's deficiencies is the inability to link domestic issues with risks using a forward looking approach. Although in some previous reports this was not the case, the challenge remains as the current analysis does not do this job in a systematic way. The same applies to the comprehensiveness of areas of the financial system covered. The Chilean FSR does cover both financial and non-financial sectors, and within the financial sector, it analysis both the banking and non-banking sector. However, this is another weak point of this report, since the balance between banks and institutional investors is not appropriate. This might be due to the size of each sector, or can be also a result of the actual structure of the report. In this sense, the challenge regarding coverage implies resolving two issues: analytical perspective and communication strategy. As pointed out by Lim et al. (2017), the latter is indeed harder to implement. For the case of Chile, these changes can be done once other issues are taken care of. One of them is the elaboration of a clear research agenda that better defines topics to different areas of the BCCH according to their expertise, and that encourages both research areas of the BCCH (the economic research and the financial research departments) to provide more input to the reports that their respective divisions now elaborate (inflation report and financial stability report respectively). Finding the balance between competition and collaboration among economists in a central bank is indeed a hard task and should be one of our internal concerns. Possibly, toxic competition between areas of a central bank could lead to discrepancies between its two most important reports, particularly if such reports are released at the same time –as it is the case for Chile. Lastly, but not uncorrelated, it was noted to us in an external evaluation done last May, that the risk assessment culture in the BCCH is low, which is usually a common theme for central banks that tend to prefer professionals with doctoral background in economics. More capacitation on risk assessment could help improve our analysis for the FSR. This would imply encouraging training and obtainment of certificates alternative to the traditional PhD in economics.

Regarding "Data, Assumptions and Tools", Chile gets lower scores for the additional information that is left available for the public, such as methodologies and disaggregated data used. Interestingly, soon after the assessment was made, the BCCH published as working paper an update document on stress test methodology used, and in the latest FSR, there are additional exercises made and explained in special boxes in the report. As for other methodologies employed in specific analysis in our boxes, the usual practice of the BCCH is to publish on the FSR web-section a complementary document that properly explains with details the analysis done. While the assessment indicates that more information should be provided by the BCCH, there are two very important aspects to consider: on the one hand, publication of disaggregated data could improve the BCCH's transparency; on the other, it could violate confidentiality. The true challenge is to improve the overall communication strategy, which is a medium-term task that the BCCH should have as priority. Modernizing its reach to the public should be one of our goals.

The last category assessed is related to the structure and other features (such as publication and communication) of the FSR. Chile obtained a lower score in the item that evaluates the flexibility of the report, as this should allow for the coverage of key topics. Reports that are examples of flexibility are the FSR of the Bank of England –thematic chapters than can change from issue to issue– and BIS Reports, that allow for thematic analysis in form of articles that follow the main section of Highlights. More recently, Brazil's FSR changed its structure, to include sections of special topics, also is improving its communication strategies.

Beyond the suggestions provided by external studies and evaluations of the Chilean FSR, the BCCH has additional challenges that are constantly considered for the improvement of its reports. The use of more disaggregated data and more sophisticated indicators is an on-going priority that could help add value to the overall assessment of risks. On the one hand, the team in charge of the elaboration of the FSR is working on indicators that could identify periods of financial stress and monitor the incubation of risks for financial stability. On the other hand, stress tests for non-bank sectors and non-financial sectors are in progress, and once few rounds of such exercises prove their reliability, they could start being incorporated more systematically in the report.

Some conclusions and directions for future work

In closing, we would like to highlight a few areas of work where we believe the BCCH should continue focusing on. First, the importance of institutional coordination and collective discussion cannot be over emphasized. Instances of open collaboration, within a framework that respects each institution's autonomy and legal mandate, need to be maintained and fostered. Currently the Financial Stability Council (CEF) provides a welcome forum for these discussions. Second, a focus on granularity and micro data needs also to be sustained. Efforts to improve stress testing methodologies, by eventually applying a top-down construction of scenarios which are then tested in a bottom-up way at individual loan level is a reasonable objective to achieve, again with the proper institutional coordination and responsibilities. Third, work on the difficult assessment of liquidity and contagion risks needs to be improved. Finally, enhancing a culture of risk assessment within the institutions would also allow a more forward-looking approach to the evaluation of systemic risks.

Unlike inflation targeting and monetary policy, financial stability monitoring and communication is fraught with difficult trade-offs. The efficacy of different tools is more uncertain, and a specific measure for the objective is harder to come-by. In contrast with the control of inflation, where a broader consensus exists on the specific role of monetary policy and the central banks, and thus sharper models and accountability processes exists, in financial stability monitoring the risk of blind spots is very real, due to too narrow (or too broad!) institutional purviews, and a diverse and vocal ecosystem of regulatory, supervisory and standard setting entities at national and supra-national level.

It is for this reason that proper benchmarking of national experiences is critical to advance this agenda. We welcome the efforts undertaken by the IMF, partly reflected in this conference, to bring about such benchmarking. Learning from different experiences allows us to discover these blind spots that could come to haunt us in the future. The global environment will continue to generate financial volatility, which needs to be carefully monitored so as to limit damaging surprises to policy makers and societies as a whole.

APPENDIX 1: **Comments on Chile's Initial Financial Stability Reports**

This note contains comments on BCCH's Financial Stability Report (FSR), based on a cross-country survey of FSRs in Čihák (2006).[6] The analysis uses methodology for assessing central banks' FSRs proposed in Čihák (2006).[7] The note is based on a review of the publicly available issues of the FSR from 2004 to 2005.

The BCCh's FSR has a number of important strengths. The report compares favorably with FSRs published by other emerging market central banks. Its strengths include:

- *Clear presentation.* The Chilean FSR contains a concise, well written summary that covers the key topics from the report. The summary covers both the risks and exposures as well as a discussion of the steps taken or planned to mitigate the impact or the risks. In addition, each chapter includes an introductory paragraph explaining the role of that chapter. The charts presented in the report are eye-catching and support well the messages in the text. The "core" of the report is well defined, distinguished from the more analytical articles at the back, and presented consistently across the report.

- *Clarity of aims.* The Foreword contains a clear statement on the role of BCCh in financial sector stability, on the aims of the report, and a definition of financial stability used by the BCCh.

- *Regular use of stress tests.* The FSR regularly uses stress tests to analyze robustness of not only banks, but also their corporate, household, and government counterparts.

- *Role in central bank's activities.* The FSR is given appropriate emphasis in the central bank's work and its dissemination. It is prominently displayed on the BCCh's website and it is easy to download. The links between the FSR and other BCCh publications are generally clear, and overlaps are kept to a minimum.

- *Articles.* The articles at the end of the report provide excellent analytical insights into topics of interest for both the BCCh and outside readers.

The cross-country survey of FSRs in Čihák (2006) also leads to several suggestions for enhancing BCCh's FSR. These include providing an operational definition of financial stability, providing stress test results as time series rather than snapshots, integrating market risks, credit risks, and contagion risks, presenting more analysis based on disaggregate data, and making the underlying data and definitions more transparent to readers. Here are the individual suggestions, ordered broadly from more general to more specific:

- *Operational definition of financial stability.* It would be useful to accompany the general definition of financial stability, presented in the Foreword, by a more concrete, operational definition, i.e. a set of indicators/issues that is key for determining the degree of robustness of the Chilean financial system. The Swiss National Bank's FSR contains an interesting effort in this respect. It defines and presents a "stress index," summarizing the various sources of stress to the system in a single indicator. This indicator, even though imperfect, is a useful tool of summarizing the various

[6] Prepared by Martin Čihák (IMF/MFD), based on the cross-country survey of FSRs presented in Čihák (2006), "How Do Central Banks Write on Financial Stability?" IMF Working Paper No. 06/163 (Washington: International Monetary Fund). The views contained here are those of the author and not necessarily those of the IMF or IMF policy.

[7] Ideally, one would of course like to assess whether the FSRs actually helped to uncover any risks that would otherwise be hidden. However, such an analysis would be very complex (it is difficult to estimate the counterfactual) and would require longer time series of FSRs.

indicators in the FSR. Another recent approach to condensing the various messages from the report can be found in the recently (July 2006) revamped FSR by the Bank of England.

- *Stress tests.* The report makes an extensive and good use of stress tests. Nonetheless, the design of stress tests and their presentation could be enhanced by:

  - *Comparing the results in the current year with those from previous years,* rather than providing only a snapshot each year. Presenting the current and previous results side by side would allow readers to understand the developments in the overall pool of risks or changes in the structure of risks faced by the Chilean financial system.

  - *Integrating the credit and market risks.* There is a disconnect between the credit risk calculations presented for enterprises, households, and government in Section III and those presented in Section IV for banks. It would be useful to link the two. Moreover, the presentations of credit risk and market risk impacts are disconnected, which may result in understating the joint impact of these risks on the banking system.[8] It would be useful to present the impact of a joint scenario incorporating both the credit risk and the market risk impacts.

  - *Analysis of linkages among financial institutions.* The FSR alludes to contagion risks, but does not contain a regular analysis of the links among banks (see, e.g., Sveriges Riksbank's or Austrian National Bank's FSR, for presentational examples) and between nonbanks and banks. As with stress testing in general, it is important to run the tests on a regular basis using a consistent methodology, to illustrate changes over time.[9]

- *Analysis based on disaggregated data.* The FSR could make more use of disaggregated data, both for financial institutions and for their counterparts. As to the financial institutions, the Deutsche Bundesbank's FSR contains an interesting example, showing the results over time of estimated probabilities of default of German savings banks and credit cooperatives (see, e.g., Deutsche Bundesbank, Financial Stability Review, November 2005, page 78.). As to the counterparts, the Macroprudential Analysis section could analyze the sources of credit risk based on disaggregated data.[10] The analysis of household indebtedness, for example, could present indicators of indebtedness and debt service ratios disaggregated by peer groups (e.g., net borrowers vs. net lenders—the same overall debt can of course have very different financial stability implications depending on whether it is spread over a range of borrowers or if it is concentrated among the financially weakest).

- *Structure of the report.* The ordering of the sub-sections of the Financial Institutions section seems unorthodox. Namely, the section starts with nonbank financial institutions before proceeding to banks. While there might be good reasons for such an ordering, the reasons are not given at the report; it would seem more natural to start from banks. Also, the title of Section III

[8] The distinction between credit and market risks, often used on bank-by-bank level, becomes rather artificial on the system-wide level.
[9] The interbank contagion calculation can include two broad approaches. The first one focuses on the risk of insolvency through interbank market. An important requirement for these calculations is a matrix of net uncollateralized interbank exposures. The calculations can be implemented in two basic ways: (i) assume a failure in one institution (e.g., because of mismanagement); or (ii) run a macro-related contagion test, where the first found of failures ("fundamental failures") is triggered by a macroeconomic stress test scenario and then a contagion is run through the system to see whether this leads to another round (and perhaps even more rounds) of failures. The second broad approach focuses on the risk of liquidity runs. An important requirement for this approach is detailed data on withdrawals during past episodes of bank runs.
[10] Some of the Nordic FSRs, such as the one by Norges Bank, provide useful examples in this regard.

(Macroprudential Analysis) is somewhat confusing, because macroprudential analysis contains also analysis of financial health of financial institutions, which is presented only in Section IV. Perhaps a more appropriate title for Section III could be “Sources of Risk” or something along these lines.

- *Underlying data.* The charts in the FSR are very illustrative and eye-catching, but it would make the FSR much more useful to readers if the BCCh also provided tables with the key underlying data. These could be included as a separate attachment, ideally an electronic file posted on the website. Such attachments are becoming more common in central bank’s FSRs (Čihák, 2006). In particular, it would be useful to provide basic internationally comparable data (Financial Soundness Indicators).

References

Born, B., M. Ehrmann and M. Fratzscher (2013), “Central Bank Communication on Financial Stability”, The Economic Journal, 124 (June), 701-734.

Čihák, M. (2006), “How Do Central Banks Write on Financial Stability?”, IMF Working Paper No. 06/163.

Čihák, M., S. Muñoz, S. Teh Sharifuddin and K. Tintchev (2012), “Financial Stability Reports: What Are They Good For?”, IMF Working Paper No. 12/1.

Jobst A., L. Ong and C. Schmieder (2013), “A Framework for Macroprudential Bank Solvency Stress Testing: Application to S-25 and Other G-20 Country FSAPs", IMF working paper No. 13/68.

Lim, C.H., A.D. Klemm, S. Ogawa, M. Pani and C. Visconti (2017), “ Financial Stability Reports in Latin America and the Caribbean”, IMF Working Paper No. 17/73.

Martínez, J-F., R. Cifuentes and J.S. Becerra (2017), “Pruebas de Tensión Bancaria del Banco Central de Chile: Actualización”, BCCh Working Paper No. 801.