INDEPENDENT EVALUATION OF THE MONETARY POLICY AND FINANCIAL STABILITY POLICY OF THE CENTRAL BANK OF CHILE

November 2019

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PREFACE

The Board of the Central Bank of Chile (*Banco Central de Chile*, or BCCh) appointed this Independent Evaluation Panel (henceforth, the Panel)[1] to evaluate the fulfillment of the BCCh's mandatory objectives as enshrined in its Basic Constitutional Act of 1989, including price stability and financial stability. The Panel was asked to review the BCCh's independence, the influence and impact of its policy actions, the suitability of its policy framework and policy tools to achieve its price and financial stability objectives, the effectiveness of its organization, procedures and policy tools for both monetary and financial stability, and the quality of its communications. In all these areas the Panel was also asked to make recommendations for potential improvements.[2] The Panel did not evaluate specific policy decisions of the BCCh, instead, focusing on the overall record and the framework, tools, and processes and procedures for making decisions.

The Panel had a kick-off meeting with the BCCh counterparty team in January 2019 in New York City, United States; a set of meetings in Santiago during the third week of March 2019 with BCCh Board Members, officials and staff, with former BCCh Governors, Board Members and officials, with officials from other regulatory institutions, including the *Financial Market Commission* (CMF) Board, with academics and with the Minister of Finance; and another set of meetings to discuss the preliminary draft of the report with BCCh officials in July 2019. The Panel also attended one of the meetings between the BCCh Board and staff in preparation of the March 2019 Monetary Policy Report, and the Board's monetary policy meeting on 18 July 2019. The Panel had access to all relevant materials published by the BCCh and enjoyed excellent cooperation and support from BCCh staff and officials.

The Panel's work benefited from recent previous evaluations of various aspects of the BCCh's monetary and financial framework and policies: an *"Evaluation of the Central Bank of Chile forecasting and Policy Analysis System for Inflation-Forecast Targeting"* conducted in 2018 by a team of the International Monetary Fund (IMF) headed by Douglas Laxton; the *"Evaluation of the Central Bank of Chile's Financial Stability Report"* conducted by Dale Gray of the IMF in June 2017; and *"Central Bank of Chile's Monetary Policy Decision-making Process, Communication and Transparency: Review and Recommendations"* conducted by Andreas Claussen from the Swedish Riksbank in December 2017.

The Panel wishes to thank Governor Mario Marcel, Board Members and staff of the Central Bank of Chile for their full cooperation, the very productive discussions, and for their great hospitality.

[1]/ The Panel members are: Karnit Flug (Panel Chair; Professor at the Hebrew University and Vice President of the Israeli Democracy Institute; Former Governor of the Bank of Israel), Guillermo Calvo (Professor at Columbia University, United States), Petra Geraats (University Senior Lecturer, and Fellow of St John's College, at the University of Cambridge, United Kingdom), Donald Kohn (Member of the Financial Policy Committee at the Bank of England and Senior Fellow at Brookings Institution, United States; former vice Chairman of the Board of Governors of the Federal Reserve System, United States), Enrique Mendoza (Professor at the University of Pennsylvania, United States).

[2]/ The precise terms of reference for the Panel are included in Appendix 1.

EXECUTIVE SUMMARY—ASSESSMENT AND MAIN RECOMMENDATIONS

General

We found the Central Bank of Chile (BCCh) to be a high quality and very professional central bank. Its analysis and policy conduct meet high standards, comparable to those of inflation targeting central banks in advanced economies. The legal framework governing the BCCh ensures that it enjoys full independence in its conduct of monetary policy.

The conduct of monetary policy in Chile over the last 20 years within a flexible inflation (forecast) targeting regime and a floating exchange rate has served the country well. Chile's macro/monetary policy management has been exemplary for emerging markets standards, and it has been able to keep medium-term inflation expectations anchored at around 3 percent.

The BCCh also has responsibility for financial stability, which it shares with other authorities. The Chilean financial system has avoided major financial disruption in the period since 1982, indicating that the BCCh has met its financial stability mandate. But roles and responsibilities are shifting after recent approval of a new banking law, and the BCCh and the other authorities are in the process of adapting to this new environment.

Our recommendations are aimed at further enhancing the ability of the BCCh to react to stress or crisis situations, continuing to improve its analytical tools, further improving its communication, especially in conveying the uncertainty around future developments and policy, and ensuring it has the ability to apply macro-prudential tools as needed. We also call for a very high level of cooperation to be established with the financial supervisors in order to successfully implement new regulations in support of financial stability.

It is important that the BCCh focuses on performing its role according to its legal mandate and avoid taking on assignments outside its mandate, in particular, duties that do not fit within the BCCh price and financial stability mandates. Such a "mission creep" should be avoided, as it may overburden the Bank and divert its resources and attention from its core duties.

Some of our recommendations can be implemented relatively quickly and involve decisions and changes that can be taken by the BCCh alone. Other recommendations involve collaboration with other institutions, developing new practices, tools and modes of operation, and new or improved data sources; naturally, these may take longer to implement.

Monetary Policy

a. Inflation target and policy horizon

The Panel's assessment is that the ±1 percent target range has not played a meaningful role in policy management and, given the volatility of headline inflation, it has been outside this range for

a substantial proportion of the last decade (about 40%). *Thus, we would suggest eliminating the range and focusing communication on the 3% target.*

Given the solid credibility of the BCCh, *the Panel recommends using some flexibility regarding the horizon at which inflation needs to be brought to the 3% target and extending it when this would benefit the Chilean economy.* Any extension of the two-year policy horizon, when decided upon, needs to be communicated and explained.

The BCCh has recently increased the horizon of its macroeconomic projections to three years. In line with this, *the Panel recommends that the BCCh extends the horizon for expectations of inflation and the monetary policy rate in the Economic Expectations Survey (EES) and the Financial Traders Survey (FTS) to three years.* These longer-term expectations also provide very useful information when exploring an extension of the policy horizon in response to specific shocks.

b. Monetary policy process

The monetary policy process is broadly consistent with how monetary policy is made at other leading central banks and seems structurally sound.

Still, the Panel's impression and that of many outside observers is that models play too large a role in the forecasts compared to judgment. It is also possible that the judgment is not revealed or discussed sufficiently with the Board or the public. This is especially the case when the underlying forces shaping the trajectory of the economy and inflation are in the process of changing, but have not yet been incorporated into the models, as has been the case in Chile recently with immigration. This may also result in a tendency to stick to the baseline scenario forecasts and a reluctance to deviate from them when faced with new information that has not yet been incorporated into the assumptions and models. In such cases, *the Board needs to apply judgment more actively to avoid unnecessary delays in internalizing these changes into the forecasts and into the policy response.*

Thus, *the Panel recommends that the BCCh review its relative reliance on judgment and models, especially in circumstances of structural changes in the economy or other sources of unexplained deviations of economic outcomes from model results. Incorporating judgment and updating models quickly will help to internalize these changes in the policy response.*

Whatever the relative reliance on models and judgment, the BCCh should be clearer and more transparent about the judgments that were made.

The monetary policy process embodies a strong desire to reach consensus on the Board. Consensus can enter at two stages: first when the staff is deciding on and presenting its forecast to the Board; and second when the Board is deciding on its forecast and associated policy decision.

The staff forecast is reported to the Board through the Chief Economist and Monetary Policy Division (MPD) Director. In order to stimulate discussion at the Board it is important for the Board to understand which difficult key judgments were made in putting together the staff forecast, why they were made, and what analysis underlay alternatives that were rejected. *The Panel recommends that the Chief Economist consider how to routinize presenting such material to the Board.*

Current and former Board Members stressed that the Board has a strong tendency to operate by consensus. In fact, dissents are relatively rare. Consensus and unanimity allow that the BCCh to "speak with one voice" so that the public and market participants will not be confused by disparate messages. However, monetary policy decisions are difficult, and good policy is aided by having diverse views represented at the table. *The Panel recommends that the Board consider how to allow the public to have a broader picture of the diverse views by Board Members, including whether the implicit hurdle for dissent has been set too high.*

c. Monetary policy analytical tools and analysis

The MPD uses two main models to support the inflation-targeting framework: MEP (a small, reduced-form model)[3] and XMAS (a large New-Keynesian dynamic stochastic general equilibrium [DSGE] model)[4]. The IMF's evaluation of the models conducted in 2018 concluded that they perform well for forecasting overall, with similar accuracy as the models used in other central banks that follow a similar approach (*e.g.* the Bank of Canada). The XMAS model is a state-of-the-art, large-scale New-Keynesian DSGE model which includes an endogenous commodity sector and takes into account the role of copper prices as a driving force of Chilean business cycles. While the XMAS model is state-of-the-art, it has the same important limitations of similar DSGE models exposed by the 2008-09 Global Financial Crisis, namely they do not provide a role for financial transmission to be part of economic fluctuations, and in particular to account for the possibility of financial crises or sudden stops. This is a limitation common to the standard DSGE models used by central banks worldwide, and the BCCh like its peers is working to address it by *incorporating financial intermediation and financial frictions into the model. This ongoing project should be made a high priority given its fundamental importance for providing the BCCh policymaking process with analysis of policy changes that capture crucial interactions between the real economy, nominal variables, and the financial sector.*

There are important technical issues with the determination of net foreign asset dynamics in the XMAS model that are important to examine. *The Panel recommends considering the limitations resulting from these issues and using those limitations as a basis to motivate further development of satellite models.*

Copper production and the copper-oil terms of trade are important drivers of economic activity and inflation in Chile, as the analysis done with the XMAS model shows. Yet the MEP model still does not incorporate them. *The Panel recommends incorporating copper prices and the Terms of Trade (ToT) into the MEP model along the lines of the recommendation made in the IMF report (2018).*

The new macro financial model is likely to be of central importance for the management of the counter-cyclical capital buffer (CCyB) and other macroprudential policies, and for the coordination between monetary and financial policies. *Hence, work on this project needs to be given high priority and an explicit timetable with specific targets for completion.*

The macro financial model should also borrow from the XMAS model important features that are relevant for the Chilean economy, particularly the modeling of copper production and the effects of terms of trade working via copper and oil prices.

[3]/ BCCh (2003), "*Central Bank of Chile Macroeconomic Models and Projections,*" Central Bank of Chile.

[4]/ García, B., S. Guarda, M. Kirchner, and R. Tranamil (2019), "*XMAS: An Extended Model for Analysis and Simulations,*" Working Paper 833, Central Bank of Chile.

Considering that the informal labor market is relatively important in Chile, the Bank should give high priority to the ongoing plans to incorporate the informal labor sector into the models used for policy decisions.

d. Monetary policy in practice

In the last 20 years the BCCh followed an inflation targeting policy that relied strongly on managing a policy interest rate under a regime of floating exchange rates. This succeeded in getting rid of double-digit inflation rates and anchoring medium-term inflation expectations to around 3 percent. This outcome has also been a consequence of strict fiscal discipline based on fiscal rules, the deepening of financial markets, sound financial regulation and supervision, and unprecedented global deflationary conditions.

e. Policy tools for times of stress

Innovative policies mitigated some, though not all, of the effect of the 2008-09 Global Financial Crisis on Chile. But the epicenter of that crisis was in the United States (US), not in emerging market economies; moreover, interest rates were at a fairly elevated level going into the crisis period. *The Panel believes the BCCh needs to consider the adequacy of its tools to counter shocks, including sudden stops, that arise closer to home, especially when interest rates could well be considerably lower and highly likely to hit the effective lower bound if the economy and financial system are hit with adverse shocks.*

Under the constitution the BCCh is not allowed to finance the government, and thus cannot make outright purchases of government bonds. This ban implies that there is a need to ensure that the BCCh has alternative policy tools to deal with economic weakness in these circumstances. In the last crisis, the BCCh used a term liquidity facility (*Facilidad de Liquidez a Plazo*; FLAP) to inject liquidity into the banking system and reinforce its message that interest rates would be kept near zero for an extended period. It also temporarily broadened the collateral pool to include term deposits by banks. It has recently incorporated into regular monetary operations the use of government bonds as collateral. In addition, it could use assets in banks' balance sheets as collateral for term repo operations. Furthermore, it could make outright purchases of foreign exchange (FX interventions, increasing international reserves). To eventually engage in "quantitative easing" (QE) to increase the monetary base and money supply and reduce term and risk premia, the BCCh can buy back its own debt held by the private sector. However, the stock of BCCh debt is declining, thus it may not be sufficient as potential future QE on a large scale. This means a larger role for fiscal policy in time of stress, for which appropriate policy space should be granted.

In addition, the BancoEstado played a key role in crisis mitigation by providing credit during the crisis. *The government should consider clarifying the framework for utilizing BancoEstado in these circumstances in the future and ensuring that BancoEstado has sufficient capital to play the desired role. This should be facilitated by the adoption of Basel III standards according to the new General Banking Law.*

The BCCh needs to periodically update its assessment of the adequate level of FX reserves based on severe (e.g. sudden stop) scenarios. This assessment should take account of the usability of the

foreign exchange in the *Economic and Social Stabilization* Fund as well as other sources of foreign liquidity in hand of the private sector. The *Financial Stability Council* (FSC) could play a role in coordinating actions during stress periods.

In the (few) occasions in which the BCCh has intervened in FX markets in recent years, the total amount of the foreign exchange intervention was made public in advance, including the mechanics of the program. This, in principle, rules out, for instance, large discretionary and surprising sales of foreign exchange that could be optimal under sudden stops. *Thus, the Panel recommends that the BCCh retain flexibility on the mode and tactics of FX intervention and clarify to the public that it has this flexibility.*

f. Monetary policy communications

Overall, the BCCh has shown a large increase in monetary policy transparency during the last two decades based on the Dincer, Eichengreen, and Geraats (2019)[5] index and its score has largely been above the average for inflation targeters.

The recent improvements in procedural and policy transparency implemented since 2018 have further raised its score. In particular, the new format of the policy statement is more informative, including individual voting records and forward guidance. It also provides a far better explanation of the policy decisions than previously. *The Panel recommends that the Monetary Policy Meeting statement is released during financial market trading hours, so that the Bank can monitor the market reaction to its policy announcement and its effect on market expectations inferred from financial asset prices.*

The forecasts are an important element of the policy analysis and the policy statement routinely refers to them, but they are currently published with a delay of one to three days in the Monetary Policy Report. The summary of the latter includes the key macroeconomic forecasts and the fan charts for inflation but not for GDP (gross domestic product) growth. *The Panel recommends that the summary of* the Monetary Policy Report *is released together with the policy statement and that the summary includes a fan chart for the quarterly GDP forecasts in addition to the inflation fan charts, and that the latter show the 3% inflation target*. It would be desirable for the entire Report to be published on the same day as the monetary policy decision. Subsequently, the Governor should present the Monetary Policy Report before the Senate.

The Monetary Policy Report analyzes external and domestic macroeconomic and financial developments that are relevant for monetary policymaking. Furthermore, it provides the Bank's macroeconomic forecasts, including medium-term projections for inflation and GDP growth with a horizon that has recently been extended to three years. *The Panel recommends that the* Monetary Policy Report *provides more transparency about the working assumptions used for the medium-term macroeconomic projections in the baseline scenario, including one or two tables with the precise (numeric) assumptions for all key variables over the projection horizon.*

[5]/ Dincer, N., B. Eichengreen, and P. Geraats (2019), Transparency of Monetary Policy in the Postcrisis World, in D.G. Mayes, P.L. Siklos, and J.-E. Sturm (Editors), The Oxford Handbook of the Economics of Central Banking, Oxford University Press.

The BCCh has recently started to provide more information about specific risks to the baseline projections. *The Panel recommends that the* Monetary Policy Report *contains a more detailed analysis of the key risks to the baseline projections. This should include where possible an explicit quantitative analysis of the effects on the medium-term projections for GDP growth and inflation under alternative scenarios.*

The changes in the baseline projections are reviewed once a year in the Monetary Policy Report, but without assessing their forecast performance. *The Panel recommends that the BCCh improves upon its annual report to Congress on changes in the macroeconomic scenario by providing an explicit review of the forecast errors for its medium-term macroeconomic projections, including a comparison to those for private sector surveys and market expectations based on financial assets prices.*

The Monetary Policy Report can be quite hard to read, including the summary. *The Panel recommends making the Monetary Policy Report more accessible, especially its summary, including a description of the Bank's monetary policy framework, a digest at the start of each chapter and a complete glossary at the end of the* Monetary Policy Report.

The Monetary Policy Meeting minutes suggest that the BCCh's monetary policy decisions are based on careful deliberation and that the discussion is of high quality. They tend to reveal the reasoning of Board Members in quite some detail, and provide invaluable insights into their perspectives and considerations. They clearly show differences in opinion among Board Members. In these respects, the Monetary Policy Meeting minutes appear more transparent and less 'sanitized' than those of some other inflation-targeting central banks, including the Bank of England.

Board Members regularly give presentations, including of the Monetary Policy Report. *The Panel recommends that the Board puts greater emphasis on the communication of uncertainty in its presentations, especially with respect to its macroeconomic projections, including using (simplified) fan charts.*

The BCCh also reaches out using social media, but *the Panel recommends that the BCCh improves its social media messages related to monetary policy, including accessible, snappy explanations of monetary policy rate decisions and using social media to help educate the public about its key objectives and decisions.*

The Panel welcomes recent improvements to the BCCh's forward guidance, which now routinely provides a qualitative conditional statement regarding the future policy direction. In addition, the state-contingent forward guidance that the BCCh has started to provide for alternative scenarios gives additional useful information about the BCCh's reaction function.

Financial stability

a. Regulatory framework and governance (decision-making process)

The responsibility for financial stability is shared by several institutions and has undergone recently legal and institutional changes. The new legal framework deepened and extended an existing regime of "co-responsibility" in which the authority—the BCCh or the Financial Market Commission (CMF)—issuing the regulation requires the prior agreement of the other authority for implementing certain specified and critical aspects of the Basel III and other aspects of financial regulation. This arrangement implies that each regulator can potentially yield a veto power over actions proposed by its counterpart. The CMF could veto the CCyB proposed by the BCCh and the BCCh could veto some elements of Basel III regulation. This may cause an inaction bias.

One key to the successful operation of the co-responsibility regime will be close consultation between the agencies as each authority comes to decide on what to propose. Coordination can be facilitated in the context of the FSC where the BCCh should play a more important role in setting the topics for discussion. *The Panel understands that mechanisms for consultation are being established and recommend that ways be pursued to build a close and productive relationship that will facilitate close working on the staff and decision-maker levels.*

The closer coordination and cooperation could be institutionalized by signing a Memorandum of Understanding (MoU) between the CMF and the BCCh. The inaction bias could also be mitigated by public disclosure of the recommendations to implement policy actions by each institution and, in the case of objections by the other institution, public disclosure of the arguments behind the objection. *Thus, the Panel recommends the timely publication of any proposed regulation or setting of a measure and its rationale alongside the response of the other agency and its rationale.*

b. Internal BCCh processes and procedures on decisions in financial stability issues

The BCCh has a sound conceptual framework for addressing financial stability risks. It uses a variety of techniques to make these judgments, including indicators, models, and bank stress tests. The Panel identified several important improvements that are needed to these techniques, especially as it adapts to its expanded responsibilities and the new regulatory structure put in place by the new General Banking Law.

The recent reorganization of the Financial Policy Division (FPD) is a welcome change. The Director of the FPD has a similar coordinating function in the financial stability area as the Chief Economist in the monetary policy area, and the Panel suggests to formally institutionalize this position if necessary. This function can be helpful in cutting through staff "silos" and being point of accountability and a point of contact for other authorities.

Only the entire Board can make decisions for the BCCh. However, given its expanded financial stability responsibilities the Board may consider whether its decision-making process on monetary policy and financial stability would benefit from a more explicit division of labor. For example, with respect to financial stability, it might designate one or a few of its members to provide preliminary feedback to the staff and to make sure the appropriate material and choices are getting to the

Board. Alternatively, there may be other ways the Board could alter its procedures to bring better structure to its financial stability deliberations and decisions.

c. Financial stability tools

The Panel recommends that the authorities put in place tools to monitor, control risk, and/or reduce severity of a crisis in the following areas:

i. Lender of last resort

An important task of central banks is the ability to act as a *lender of last resort* (LOLR) when an otherwise viable bank encounters liquidity problems. The shared responsibility of the BCCh and the CMF in protecting the financial stability of banks requires the division of labor and coordination to allow prompt and effective action when deemed appropriate. To facilitate speedy response, *a protocol needs to be drafted and kept up-to-date on the process leading to and acting as a LOLR*. Information sharing is a critical element in the decision-making process regarding LOLR.

To facilitate speedy action in times of stress *it is important to conduct exercises of LOLR and crisis management together with the* CMF *and the Ministry of Finance* (the last exercise was conducted in 2012.)

ii. Counter-cyclical capital buffer

Notwithstanding the current legal framework, it is key that the BCCh and the CMF need to agree on the broad framework for regular consideration and timely adjustment of the CCyB.

The Panel recommends that the BCCh utilize Chile's real bank credit gap together with other relevant information and indicators to set the activation and maximum thresholds for the CCyB (the technical issues in calibrating the CCyB are discussed in the report).

It is important that the BCCh allocate adequate resources to the development of methodology and criteria for the decision on the CCyB.

iii. Stress tests

The BCCh and the CMF *should cooperate closely on the concurrent stress tests of banks and the banking system.* In this regard sharing of information is of particular importance and could be formalized within an MoU. This cooperation should also consider the publication of the results of the stress tests for individual banks once a sufficiently robust design for them has been developed, and the BCCh and CMF agree on the role of these stress tests in supervision, regulation, and the implementation of macroprudential policies.

The vector autoregression (VAR) model used to construct the stress tests has elements that need further analysis. *First is to what extent the stress assumptions should incorporate some elements from the most severe financial event in Chile, which was the 1982 crisis. Second, explore ways of*

extending the analysis to consider possible risks for banks resulting from the growing relevance of nonbank financial intermediation that are not explicitly considered in the current stress-testing framework. Third, examine the robustness of the assumptions about timing of causality in the VAR between the real and financial sectors to consider that credit ought to affect output contemporaneously and with lags, just as output affects credit.

iv. Resolution of systemically important banks

Orderly resolution of systemically important banking organizations would limit the adverse spillovers to the rest of the economy resulting from a failure of a systemically important institution. Thus, resolution authority is considered an essential element of internationally agreed post-crisis reforms ending too big to fail and *the Panel recommends setting up such a process.*

v. Oversight of non-bank financial institutions

In its Financial Stability Report (FSR), the BCCh catalogues the rapid growth of nonbank lenders to households. Furthermore, as capital requirements come into line with Basel III, more credit could migrate outside the banks. Thus, although the failure of one of these lenders may not yet rise to the level of a systemic event, the economy could feel the effects if problems with one lead to contagion of others. Therefore, at a minimum, the authorities should be sure *they are gathering good information about nonbank lenders and make regular systematic reviews of risks beyond the banking sector with a view to assessing whether the regulatory perimeter should be adjusted to preserve financial stability.*

vi. Credit registry

The rise of nonbank lenders to households makes it more difficult to have visibility into the total indebtedness of an individual borrower. Borrowing is tracked across banks, but not across banks and nonbanks. In its FSR, the BCCh recommends that a credit registry be created that encompasses the debt of households wherever incurred. The Panel agrees with this recommendation; *a comprehensive credit registry would contribute to financial stability by enabling lenders to better manage risks and by giving the authorities greater insight into the evolution of indebtedness and household debt service obligations*. The CMF would be the institution that should promote the establishment of a registry and define the required legislation.

vii. Authority to implement macroprudential loan-to-value and debt-to-income regulation

The CMF has authority to impose loan-to-value (LTV) regulation on residential mortgages, but its focus is on micro-prudential considerations. Housing booms and mortgage markets have been an important source of financial instability. Thus, it is important that macroprudential considerations also be taken into account in designing LTV and debt-to-income (DTI) regulation. *The Panel recommends that the BCCh proactively provide advice and recommendations when it deems it necessary to impose such restrictions for macroprudential purposes.* It is important for some authority to have the ability to constrain the growth of high-risk loans through limits on loan-to-income, LTV, or debt service ratios when increases in those measures are seen to pose a threat to financial stability.

d. Communication of financial stability

The separation of the publication of the Financial Stability Report from that of the Monetary Policy Report since 2018 is a significant improvement as it facilitates more focused communication and public attention for the main messages of each of the reports.

The FSR compares well to those of other central banks, and its analytical content has recently been enhanced. Nonetheless, the FSR could be more forward looking and prescriptive: for example, it does not systematically recommend ways to mitigate the risks it identified according to their severity. *The Panel recommends that Financial Stability Report should be more forward-looking and that the BCCh look for ways to more clearly convey financial stability risks and vulnerabilities in the Report. One way could be using graphic representations of the degree of vulnerability.*

The Panel welcomes the recent addition of an analytical chapter on a special topic. *The Financial Stability Report may be further strengthened by increasing the use of analytical boxes.*

e. Resources and skills

The BCCh has relatively small staff that is highly productive considering the high quality and quantity of their output and the strong performance record and the strong reputation world-wide as one of the central banks with an active research environment and high-quality research output that contributes effectively to the policy-making process. However, present and future work implies that additional staff positions are needed in the MPD and in the FPD. The proposed addition of 4-6 PhD level positions in the near future, as well as the recent reorganization of the FPD, are movements in the right direction. Considering the time, it takes to fill new positions with qualified candidates and natural turnover of current staff, the BCCh will continue to have a relatively small staff.

The BCCh should ensure that people in managerial positions have the appropriate set of skills, and the introduction of the leadership program is a step in the right direction. The BCCh should also consider an alternative non-managerial career path for researchers and other technical experts.

Given the expanded responsibilities of the BCCh it is important that the Board continues to have expertise that encompasses all its responsibilities.

Public accountability

The BCCh's website is a portal to the Bank's decisions and publications, but it can be hard to find specific information. *The Panel recommends that the BCCh significantly improves its website by making it more informative and user-friendly, including a page with an up-to-date description of its monetary policy framework, adding links to presentations and webcasts on the Monetary Policy Report web pages, and fixing the problems with the website search facility. Also, it would be desirable to improve the availability, timeliness and accuracy of key monetary policy communications in English, including the full version of the Monetary Policy Report (within two weeks, as done in the past) and the Governor's presentation of the Report before the Senate and at the press conference, including the question and answer sessions.*

Likewise, the website provides very limited information in English related to financial stability. *The Panel recommends that the BCCh significantly extends the financial policy section of its website, including a description of its definition of financial stability and financial policy framework, and adding links to presentations and webcasts on the Financial Stability Report web pages.*

The BCCh should be complimented for initiating a series of reviews, including the current evaluation of its policies and procedures for achieving both its price and financial stability objectives.

The Panel recommends that the BCCh continues to commission regular reviews of its monetary and financial policymaking, which could be covered in separate evaluations every few years.

1. LEGAL AND INSTITUTIONAL FRAMEWORK

1.1. BCCh Legal Framework and Independence

The BCCh is an autonomous organization, of constitutional rank, technical in nature, with legal status, its own capital and indefinite duration, as set forth in Article One of its Basic Constitutional Act (*Ley Orgánica Constitutional or LOC*). Its objectives include "looking after the stability of the currency and the normal functioning of the internal and external payment systems" (Section 3).

The BCCh LOC includes a series of mechanisms for coordinating monetary and fiscal policies while safeguarding the independence of the respective authorities.

The BCCh is governed by a Board. The Board's five full-time members are appointed, one at a time, by the President of Chile and approved by the Senate. Board Members hold office for a term of 10 years and their appointments may be renewed. The Governor of the BCCh (who is also Chairman of the Board) is appointed by the President of Chile from among the Board Members for a term of five years or the remainder of the appointee's term, whichever is less, and this appointment may also be renewed. The Deputy Governor is elected by the Board from its Members.

The Board is responsible for monetary policy and the BCCh's financial stability functions, and for the supervision and administration of the Bank. The Monetary Policy Division (MPD) supports the Board in the monetary policy process and with monetary policy communication and transparency. The Financial Policy Division and Financial Markets Division provide support for the BCCh's financial stability responsibilities.

With full autonomy over management of its budget and policy decisions, the BCCh's Board reports to the President of Chile and the Senate, and makes decisions keeping in mind "the general orientation of the Government's economic policies" (Sections 4 and 6). Bank autonomy is reinforced by the fact that the Chilean Constitution (Article 109) does not allow it to make loans to the public sector, except in the case of external warfare or danger thereof, and is ruled by LOC Section 27.[6] Moreover, its LOC explicitly requires "justified reason with the prior approval of the Senate" (Sections 16 and 17) before the President of Chile can remove any Board Members.

The free flow of capital into and out of Chile is established as the default in the Central Bank's LOC (Section 39). But the Board has the authority to set specific restrictions.

Aside from keeping in mind the general orientation of the Government's economic policies, formal coordination exists as the Minister of Finance attends and can speak and propose resolutions at BCCh Board meetings and can postpone implementation of any Board resolution (for 15 days), unless the Board unanimously insists on implementation (Section 19). The Minister can veto any resolution on restrictions that the Bank is empowered to apply to foreign currency exchange, unless Board Members unanimously confirm support for the resolution.

[6]/ BCCh LOC, Section 27: "The Bank may grant financing or refinancing to banking entities and financial institutions exclusively. Under no circumstances shall the Bank grant to such entities and institutions its guarantee, nor acquire securities issued by the State, its agencies or state-owned enterprises. No public expenditure or credit of whatsoever nature may be financed with loans granted, directly or indirectly, by the Bank. However, in the event of foreign war or threat of foreign war, to be qualified by the Council on National Security by means of a secret resolution, the Bank may obtain, confer or finance credits to the State and to public or private entities."

By law, the September Monetary Policy Report includes an annual evaluation on the progress of policies and programs for the year to date, and proposals for the next calendar year (Section 80).

Although the autonomy of the BCCh is enshrined in Chile's Constitution (Article 108), political pressure could potentially be exerted through the reappointment of Governors and Board Members. During the last decade, however, there have been no reappointments, so the Governor and Board Members effectively have a single term.

In addition, during our meetings with current and former Board Members and Ministers of Finance, we got the impression that the independence of the BCCh has generally been respected, without political pressure.

But another potential threat to its independence is the fact that the BCCh has negative net worth (of 2% of GDP, end 2018), which is a legacy of financing the rescue of the banking system during the severe financial crisis in the first half of the 1980s, as well as the financial cost of large sterilized accumulation of reserves in the first half of the 1990s. A central bank that is financially dependent on the government could be more vulnerable to political pressures. In practice, however, this has not been an issue because the BCCh is able to cover its operating expenses, demand for money has increased steadily, and the net worth of the state is positive, thanks to prudent fiscal policy featuring a fiscal rule and sovereign wealth funds. But in times of crisis (discussed in Chapter 3), the fiscal position could quickly deteriorate, and a worsening of the BCCh's negative net worth may become a threat to its financial independence and operational effectiveness. Although the Board can increase capital through the capitalization of reserves and is entitled to request an increase of the BCCh's capital from the Minister of Finance (by Section 5 of the BCCh LOC), it may be challenging to accomplish this during a crisis.

The Panel's assessment is that the legal framework governing the BCCh ensures that it currently enjoys strong independence in its conduct of monetary policy, although its negative net worth may make it vulnerable in times of stress.

The Constitutional ban on the purchase of government debt, including in the secondary market, poses a constraint on the use of quantitative easing (QE) as was used by many central banks in advanced economies that were close to the effective lower bound (ELB) of the policy rate during the 2008-09 Global Financial Crisis (GFC). Thus, in the absence of the main QE tool, the BCCh needs to ensure that it has sufficient policy tools to use in times of stress (which is further discussed in Chapter 3).

1.2. Institutional Environment in Chile

The BCCh benefits from a strong macroeconomic and financial institutional framework in Chile. As mentioned, prudent fiscal policy plays an important role. The government has implemented a structural balance rule since 2001 that aims to set a level of fiscal spending that is consistent with the government's structural income, thereby insulating it from cyclical fluctuations in economic activity and the price of copper. Thus, the fiscal deficit is countercyclical through automatic stabilizers, thereby supporting monetary policy.

The structural balance rule was enshrined in legislation through the Fiscal Responsibility Law of 2006, which also created two sovereign wealth funds: the Pension Reserve Fund (PRF) and the

Economic and Social Stabilization Fund (ESSF),[7] which was founded in 2007 and superseded the Copper Stabilization Fund that was established in 1985 and used by the government to save a portion of its revenue from copper exports. The PRF receives an annual contribution of 0.2%-0.5% of GDP, while the ESSF largely receives any remaining fiscal surplus. The purpose of the ESSF is to finance fiscal deficits in periods of low economic activity or low copper prices, which makes it a useful tool in times of stress. The market values for the PRF and ESSF are USD 10 billion and USD 14 billion (as of June 2019), in total around 8% of GDP.

Although the fiscal rule means the government has to set a target for the structural balance, the actual outturn may be quite different.[8] So, the recent creation of an independent Fiscal Council with the resources and power to safeguard responsible and sustainable public finances is a welcome strengthening of the institutional framework. All in all, the structural balance rule and ESSF and PRF enable fiscal policy to contribute to macroeconomic stabilization in both normal and crisis times, which greatly facilitates monetary policymaking.

Furthermore, the financial regulatory framework has recently undergone a major improvement and consolidation through the establishment of the Financial Market Commission (*Comisión para el Mercado Financiero, or CMF*). It was created in 2017 as the successor to the Superintendence of Securities and Insurance, and following the new General Banking Law, it integrated in June 2019 with the Superintendence of Banks and Financial Institutions (*Superintendencia de Bancos e Instituciones Financieras, SBIF*). Thus, the CMF has become the principal financial regulator and supervisor in Chile, covering securities, insurance markets, banks and other financial institutions under its purview. In addition, the new General Banking Law, which was enacted in January 2019, is giving the BCCh a macroprudential policy tool—a countercyclical capital buffer.

The new regulatory landscape and macroprudential responsibilities facing the BCCh are further discussed in Chapter 5.

Also important is the Financial Stability Council (FSC) (*Consejo de Estabilidad Financiera*), which is chaired by the Minister of Finance and now includes the heads of the CMF, the Superintendence of Pensions, and the BCCh (the latter as permanent advisor, to preserve the BCCh's autonomy). It was set up in 2011 in the aftermath of the GFC and given legal status in 2014 to oversee the stability of the financial system in Chile. It plays a pivotal role in the coordination and exchange of information to prevent and manage financial stability risks and crises.

The financial system in Chile has also benefited from the fully funded pension system (based on defined contributions) that was introduced in 1981, because the private companies managing the pension funds (*Administradoras de Fondos de Pensiones or AFP*) boosted the capital market, playing a key role to funnel private savings to investment finance.

Another notable feature in Chile is the wide-spread use of the unit of account UF (*Unidad de Fomento*), which is indexed to the Consumer Price Index (CPI) with a lag of around a month.[9] It is commonly used for asset prices, such as house prices, and financial instruments, including

[7]/ The BCCh acts as fiscal agent for the PRF and ESSF.

[8]/ For instance, the target for 2009 was 0%, but the actual structural deficit reached over 3%. In addition, despite efforts to reduce the structural deficit, it rose to 2% in 2017.

[9]/ To be precise, the value of UF is adjusted on a daily basis, from the 10th day of each month until the 9th day of the next month, at the average geometric rate corresponding to the change in the CPI in the preceding calendar month.

mortgages and bonds. The use of UF makes it less risky to hold long-maturity assets, thereby deepening the capital market. The UF also provides a relatively safe domestic alternative to pesos, which may have helped keep dollarization low in Chile, unlike many other emerging economies, where it greatly complicates monetary policy. On the other hand, the popularity of UF induces inflation inertia, which makes it more difficult to bring inflation back to target.

Common to other emerging economies, the Chilean labor market is characterized by a large informal sector of around 30% of total employment, which is countercyclical.

All in all, the BCCh operates in a legal and institutional environment with some unique features.

PART I: MONETARY POLICY

2. MONETARY POLICY FRAMEWORK, PROCESS AND ANALYSIS

2.1. Inflation Targeting Regime

Under the Basic Constitutional Act (LOC), the BCCh's purposes include "to look after the stability of the currency." The BCCh, as other inflation targeters, has interpreted this to mean that it should stabilize the internal value of the currency by protecting the stability of the purchasing power of the currency against the basket of goods and services in Chile's CPI. Specifically, it aims for "low, stable inflation sustainable over time", which it operationalizes by aiming at "inflation remaining within a range of one percentage point plus or minus the 3% target" for the CPI. It sees its primary monetary policy contribution to the development of the economy as attaining its price stability target, though it also recognizes and takes into account that its actions can affect real output in the short to intermediate term.

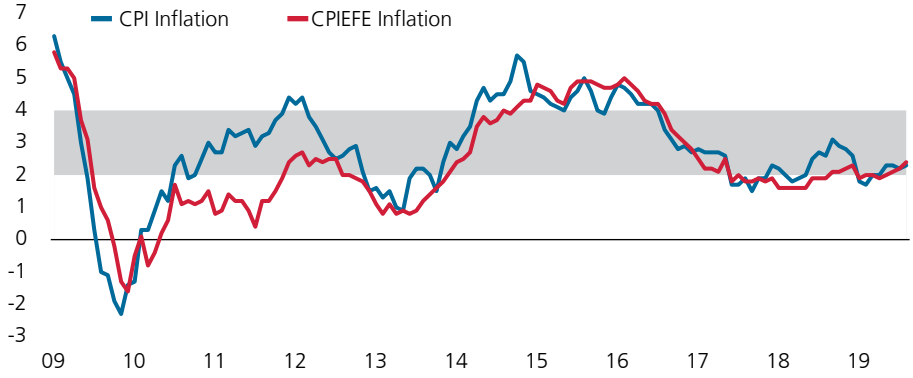
The BCCh bases its meeting-to-meeting consideration of monetary policy actions, and its public communication about those actions on achieving an objective of 3% CPI inflation no later than by the end of its two-year policy horizon. That time frame recognizes the lags in the effects of monetary policy and accommodates concerns about the volatility of output and other variables, as well as the presence of temporary or one-off shifts in some CPI components. Thus, the BCCh is a flexible inflation forecast targeter—the framework adopted by many central banks and considered best-practice.

According to the BCCh (2007, p. 17), setting the target range at plus or minus one percentage point sends three main signals: tolerance to temporary deviations of actual inflation away from the 3% target; symmetrical concern about deviations below target and above target; and the level of normal variability of inflation along the business cycle. However, it should be noted that over the last 10 years, the 12-month CPI inflation rate was outside the 2-4% range in over 40% of the months.

Since CPI inflation can be volatile due to temporary, external factors, it is useful to consider core inflation as well using CPIEFE, which is the CPI excluding food and energy prices. During the last decade, the 12-month CPIEFE inflation rate was actually outside the 2-4% range most of the time, for two-thirds of the months (see Figure 1).

Figure 1.

Headline and core inflation, 2009-2019.



Note: 12-month inflation in percent, 1/2009-8/2019. The gray area marks the range of ±1 percentage point around the 3% inflation target. Source: BCCh.

But the goods component of CPIEFE inflation is also subject to external influences, because it is usually positively correlated with depreciations of the peso as they result in higher inflation of imported goods. Although the Chilean peso is affected by the BCCh's monetary policy, it is often driven by fluctuations in the price of copper, which can be sizeable and persistent. In addition, the value of the peso is subject to the vicissitudes of international financial markets. Thus, core inflation in Chile is also to a large extent driven by external factors that are outside the BCCh's control.

Further complicating the stabilization of inflation in Chile is the fact that inflation of the services component of CPIEFE (which has a weight of around 45% in the CPI) is usually quite inertial since it is affected by indexation to past inflation (as is often noted in the BCCh's Monetary Policy Report). This makes any deviations from the inflation target more persistent. As a result, it is not surprising that inflation and even core inflation can be outside the 2-4% range for much of the time and for prolonged periods. For instance, CPIEFE inflation was above 4% from October 2014 until July 2016. For some types of shocks, such as strong swings in the copper price, inflation could be outside the 2-4% range for a substantial period and may take more than two years to return to the 3% target.

The focus of BCCh monetary policy has been on achieving the 3% inflation target in two years, without reference to the tolerance range. Thus, the question that arises here is whether the experience so far justifies maintaining this tolerance range and fixed horizon.

The behavior of private sector survey expectations and the comments of those we interviewed strongly indicate that the BCCh has considerable credibility for achieving its goal of low and stable inflation, that its successful focus on price stability has provided a key pillar to broader policymaking in Chile, and that this has been an important achievement of the BCCh over time and a major contributor to public welfare in Chile.

In the Panel's observations, the BCCh did not utilize the "plus or minus one percentage point" aspect of its announced inflation target—it is always aiming at 3% and explaining its actions relative to that objective. Moreover, it is always aiming at achieving that objective in no more than two years. Both aspects—the firm target and the fixed time frame—were seen as helping to establish the BCCh's credibility for "looking after the stability of the currency".

Against that background, with respect to the inflation target, the Panel recommends:

1. That the *BCCh drop references to "plus or minus one percentage point" and focus all its communication on the 3% target.* Practices differ around the world. Some central banks, for example the Reserve Bank of Australia and the Bank of Israel, state their targets in a range, but most focus on a single point (often 2% among industrialized economies) and find that disciplines policymaking and simplifies communication. In our observation and reading, the range does not affect monetary policymaking in Chile, and clarity and transparency would benefit from dropping it.

2. That *the BCCh maintain some flexibility regarding the horizon at which inflation needs to be brought to the 3% target. Whenever the horizon is indeed extended, this should be disclosed and explained.* As noted, the BCCh already has considerable credibility for its pursuit of price stability. There may be times when taking longer to reach the target will reduce the expected volatility of output or asset prices. The sources or type of shocks that lead to the deviation of inflation from its target, and the state of the economy may influence the lag with which policy

affects inflation and output, and thus may affect the desirable horizon within which inflation should be brought back to the target. For example, services inflation is typically quite inertial, in part because it is affected by indexation to past inflation, which might imply that under some circumstances, adopting a longer horizon could reduce output variability, provided long-term inflation expectations remained anchored. To avoid undermining policy discipline and credibility, the expectation of returning to three percent in no more than two years could be retained as the default time frame, with the reasons for any expectations of longer times carefully and publicly explained.

3. That *the BCCh extend the horizon for private sector expectations for inflation and the monetary policy rate in the Economic Expectations Survey (EES) and Financial Traders Survey (FTS) to three years, in line with the longer three-year horizon for its macroeconomic projections.* These longer-term expectations provide very useful information that adds to the analysis of private sector expectations in the Monetary Policy Report and allows the BCCh to better assess the option of a longer policy horizon.

Like other central banks, the BCCh has found it difficult to raise inflation to its target in recent years, partly due to global disinflationary forces. At the same time, the economy has shown a muted response to very low real interest rates; the BCCh now estimates that the equilibrium real interest rate is only around 1%. Reflecting these forces, after the BCCh's recent June meeting, the policy interest rate stands at only 2.5%. As in other jurisdictions, the BCCh could well be left with limited scope to reduce interest rates to counter a downward shock to the economy and inflation going forward. In the United States and elsewhere, discussions have begun on whether the inflation targeting framework should be adjusted to take account of secularly low interest rates. Specifically, whether some sort of "make-up" framework would be useful in which persistent undershoots of inflation targets are compensated for a period by overshoots of the target. Such a framework might have beneficial effects on inflation and policy expectations if inflation does tend to fall short of objectives more often than it exceeds them.

These are complex strategies with a number of costs and benefits. The Panel is not recommending that one of them be adopted in Chile. But it is recommending that:

4. *The BCCh initiate a research project to examine the implications of persistently low interest rates for the ability of monetary policy in Chile to achieve its objectives.*

2.2. Monetary Policy Process

Monetary policy is made in a series of Board meetings and informal consultations with staff. There is a weekly cycle, a bimonthly cycle for the Monetary Policy Meeting (MPM) and a quarterly cycle for the Monetary Policy Report (MPR).[10]

In September 2017 the BCCh announced some changes to its monetary policy decision-making process (and to its monetary policy communications and transparency). The changes became effective on January 2018 and reduced the number of scheduled MPMs from 12 to 8 per annum, in line with

[10]/ Note that in this Evaluation Report the MPR refers to the *Monetary Policy Report* and not the *monetary policy rate.*

current practice at other leading central banks. In addition, the MPM and MPR cycles are now aligned such that an MPR is released shortly after every other MPM. This allows the Board to make a better-informed policy decision based on an up-to-date MPR (including its macroeconomic projections), which can also be used to better explain the decision. In addition, the Board no longer needs to prejudge the main message of an imminent MPR, which often put it in an uncomfortable position (as revealed in the MPM minutes), that complicated the policy decision and any forward guidance. So, the MPR-MPM alignment has significantly improved the monetary policymaking process.

Meetings

1. The Board meets weekly to be briefed by staff on recent developments in domestic and foreign economies and financial markets. This provides a common factual basis for considering policy options.

2. For the four MPMs each year when a MPR will not be published, the Board meets on two days. On day one they are presented with the main developments since the last MPR was published to judge whether the data have been consistent with the baseline scenario in the last MPR. On day two the Board meets twice: In the morning the staff discusses any changes to the outlook required by from the flow of data since the MPR; the Chief Economist presents the staff's recommendation for the Board's decisions—usually two options with pros and cons; and the staff presents a draft communiqué (except for the last policy paragraph) and receives suggested changes by the Board. In the afternoon the Board first votes on the decision, with each Member giving his or her reasons for their vote, and then drafts the final policy paragraph.

3. Four times a year, the MPMs are tied to the production of the MPR. The Board meets five times with staff to review developments since the last MPR and settle on a forecast of the major variables over the two-year policy horizon and how it should be presented in the MPR. In MPR rounds, the MPM last only one day, resembling the second day of the non-MPR rounds; since the forecast is established in the MPR, what remains for the MPM is the policy decision itself.

Consultations and discussion

The people we interviewed described an extensive consultative process that happened around the meetings. That process revolved around the Chief Economist, who is responsible for marshalling staff resources and coming up with a staff forecast to present to the Board. The Chief Economist consults with all the Board Members in the lead up to the MPM, but most closely with the Governor as the chair of the meeting and the person who will be presenting the forecast and policy decision to the public, financial markets, and the Senate.

This process is broadly consistent with how monetary policy is made at other central banks and seems structurally sound. However, in our conversations with current and former policymakers and knowledgeable outside observers, the Panel identified several issues with policy processes the BCCh should consider addressing:

1. *The degree of reliance on models relative to judgment.* Any forecast or policy decision is going to be based on some mix of models and policymaker judgment. Models are an important source

of discipline on policymakers—they foster internal consistency in a forecast and consistency with the history embodied in the empirical work that goes into the models; in effect they can bound judgment and enhance systematic reasoning and policymaking. The next section in this report has some recommendations about improving the models. But models will always be imperfect and incomplete representations of reality; ultimately a forecast of the BCCh and the policy based on the forecast must reflect the judgment of the policymakers.

Several observers were of the view that models played too large a role in the forecast and judgment too small a role. This is especially the case when the underlying forces shaping the trajectory of the economy and inflation are in the process of changing, but have not yet been incorporated into the models, as has been the case in Chile recently with immigration. In particular, the BCCh was seen as placing too much reliance on models in its judgments about the output gap and the neutral interest rate last fall. The heavy reliance on the models may also result in a tendency to stick to the baseline scenario forecasts and a reluctance to deviate from them when faced with new information that has not yet been incorporated into the assumptions and models.

The Panel recommends that the BCCh review its relative reliance on judgment and models, especially in circumstances of structural changes in the economy or other sources of unexplained deviations of economic outcomes from model results. Incorporating judgment and updating models quickly will help to internalize these changes in the policy response.

It may be that judgment already plays a large role in the forecast and policy decision. But that is not clear to many outside observers. *The Panel also recommends that whatever the relative reliance on models and judgment, the BCCh be clearer and more transparent about the judgments that were made.*

2. *The drive to consensus.* The monetary policy process embodies a strong desire to reach consensus on the Board. Consensus can enter at two stages: first when the staff is deciding on and presenting its forecast to the Board; and second when the Board is deciding on its forecast and associated policy decision.

The staff forecast is reported to the Board through the Chief Economist, who is also MPD Director. He takes inputs from the modelers and from experts in various aspects of the Chilean and global economies. That process does allow alternative perspectives to be heard. But it is unclear to what extent and how regularly alternative staff views are aired before the Board. It is important for the Board to understand which difficult key judgments were made in putting together the staff forecast, why they were made, and what analysis underlay alternatives that were rejected. *The Panel recommends that the Chief Economist consider how to routinize presenting such material to the Board.*

Current and former Members of the Board stressed that the Board operates by consensus. In fact, dissents are very rare (none over 2018 and one in 2019), and Members of the Board rarely voice alternative perspectives in public. Consensus and unanimity mean that the BCCh does "speak with one voice", usually that of the Governor, and the public and market participants will not be confused by disparate messages. Finding consensus across political lines on the Board may also help insulate the Bank from politically motivated criticism. However, monetary policy decisions are difficult, and good policy is aided by having diverse views represented at the

table. Ultimately public confidence and credibility should be enhanced by demonstrating that the policy decisions were forged after considering different perspectives, some of which may be strongly enough held to result in dissents. *The Panel recommends that the Board consider how to allow the public airing of more diverse views by Board Members, including whether the implicit hurdle for dissent has been set too high*.

2.3. Monetary Policy Analysis—Analytical Tools and Framework

The MPD uses two main models to support the inflation targeting framework: MEP (a small, reduced-form model), and XMAS (a large New-Keynesian dynamic stochastic general equilibrium [DSGE] model). The baseline forecast published in the MPR is an average of the forecasts produced by these two models which incorporate judgement. The IMF's evaluation of the models conducted in 2018 concluded that they perform well for forecasting overall, with similar accuracy as the models used in other central banks that follow a similar approach (e.g. the Bank of Canada). The models use a modified Taylor rule for the policy interest rate, and they have tended to over-predict the level of this rate. The IMF report recommended switching to a loss-minimizing reaction function as a way to address this issue. There are also other short-term forecasting models, a global projection model with more features of the world economy, and other supporting models of DSGE and non-DSGE nature.

The MEP model has four equations: A Phillips curve, a Taylor rule, an Investment-Saving (IS) equation, and an uncovered interest parity equation (Fornero et al., 2018, describe the model in detail). The IS equation has four variables that introduce effects from the rest of the world: measures of the output gaps of emerging and advanced economies, the real exchange rate gap and the non-copper terms-of-trade gap. The interest parity condition allows for country risk. The model abstracts from the commodities sector, notably the copper sector, because it uses GDP defined as non-resource-sector GDP (projections produced by sectoral specialists for the commodities sector are added separately to generate a forecast for total GDP). Similarly, fluctuations in the terms-of-trade inclusive of copper are excluded. The simplicity of this model makes it suitable for short-run evaluation of the evolution of inflation and output, and useful for communicating the specific aims and motivations of monetary policy at a given juncture. On the other hand, the MEP model has all the standard shortcomings of reduced-form macroeconometric models when used for policy analysis, most notably the Lucas critique. In addition, the exclusion of the copper sector and the terms of trade are important limitations, given the relevance of these factors for economic fluctuations in Chile. *The Panel recommends incorporating copper prices and the terms of trade into the MEP model along the lines of the recommendation made in the IMF report (2018).*

The XMAS model is a state-of-the-art, large-scale New-Keynesian DSGE model which includes an endogenous commodity sector and takes into account the role of copper prices as a driving force of Chilean business cycles. The 2018 IMF report illustrated this nicely with an impulse-response function for copper price shocks of high, mid and low persistence.[11] Persistence matters because in the model the effects of copper price movements are driven by adjustments in copper production that are slow moving and stronger the more persistent are the shocks. Purely transitory shocks yield very weak effects, other than an improvement in the trade balance (as predicted by the Harberger-Laursen-Metzler effect), but shocks with mid and high persistence demonstrate the relevance of

[11]/ The model was significantly upgraded in 2019 and it now includes a labor market with search and matching frictions and a larger fiscal sector. The full model is described in a paper by García et al. (2019).

these shocks for real and nominal variables. In particular, higher copper prices appreciate the real and nominal exchange rates and reduce inflation, even though consumption, investment and output also rise. Moreover, the IMF analysis also shows that it is not just copper prices but the terms of trade that matter for these results. A shock increasing oil prices (i.e. a negative terms-of-trade shock for Chile) has qualitatively similar effects as a shock to copper prices (with the opposite sign): inflation rises while consumption, investment and output fall. Thus, XMAS model forecasts embody a framework in which fluctuations in the terms of trade are important drivers of inflation and output dynamics in Chile. In particular, stronger terms of trade work to reduce inflation despite their expansionary effect on the real economy.

While the XMAS model is state-of-the-art, it has the same important limitations of similar DSGE models exposed by the Global Financial Crisis, namely they do not provide a role for financial transmission to be part of economic fluctuations, and in particular to account for the possibility of financial crises or *sudden stops*. This is a limitation common to the standard DSGE models used by central banks worldwide, and the BCCh like its peers is working to address it. The progress in the ongoing work introducing financial transmission and financial stability considerations into the DSGE framework is discussed later in this report (in Chapter 6).

Another important limitation of DSGE models like XMAS is that they do not fully capture the dynamics of external adjustment and net foreign assets (NFA), and their interaction with the real sector and inflation. This is because of a well-known drawback of the methods used to solve these models that requires imposing exogenously a long-run NFA position that remains invariant to policy changes and shocks (see Appendix 3 for full details). As a result, wealth effects and the effects of precautionary savings and buffer-stock mechanisms, which are embodied in the theory of the models because they assume non-state-contingent financial assets (i.e. incomplete markets), are poorly approximated.

To be clear, the BCCh is doing what is the standard practice with large-scale DSGE models in this regard, but their limitations are nonetheless important. *The recommendation here is not to abandon this approach, but rather to be aware of its limitations and to view these limitations as motivation for further development of satellite models.* For example, if terms-of-trade volatility falls or there is a persistent decline in the world real interest rate, a model that has been solved fully taking into account the wealth and precautionary-savings effects of incomplete markets would predict a slow-moving but very large decline in NFA leading to a much lower predicted long-run average of NFA. The transition would imply a prolonged period of current account and trade balance deficits, with implications for economic activity, exchange rates and inflation. In contrast, DSGE models miss these implications or underestimate them significantly (e.g. the typical first-order solution of large DSGE models would predict that the NFA-GDP ratio returns to its exogenously set value). Similar issues apply to scenarios aiming to evaluate the effects of structural changes, such as tax reforms, demographics, immigration, financial regulation, optimal reserves accumulation, openness of the capital account, etc.

The above problems could be addressed by developing a parsimonious satellite model that can be solved with global methods. This model could be used to complement the policy analysis of the external adjustment dynamics based on experiments using the XMAS model. For instance, the evaluation of the effects of terms-of-trade shocks could be enriched with the predictions derived from a model that captures fully the wealth and NFA implications of these shocks. Moreover, this model could also be extended to incorporate endogenous financial crises triggered by financial frictions and to examine the implications of macroprudential financial regulation. These issues are discussed later in this report (in Chapter 6).

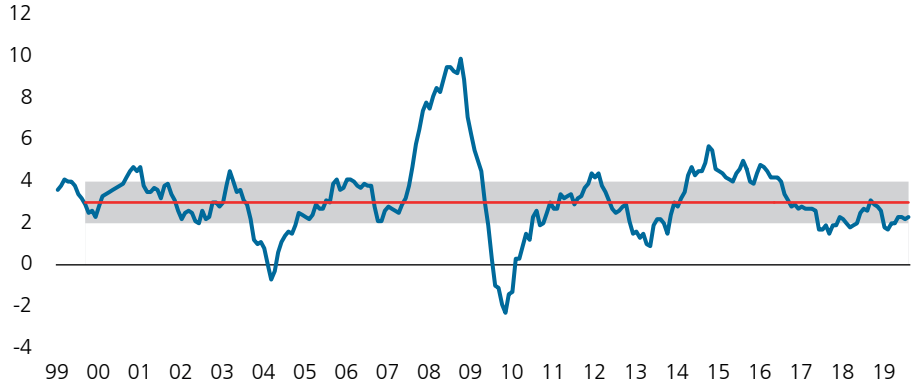
3. MONETARY POLICY CONDUCT AND OUTCOMES IN NORMAL TIMES AND IN CRISIS TIMES

3.1. Monetary Policy in Normal Times

In the last 20 years, and as a general rule, the BCCh followed a flexible inflation targeting policy that relied strongly on managing a policy interest rate under a regime of floating exchange rates. This policy, together with a strict fiscal discipline and deflationary global conditions was successful in getting rid of double-digit inflation rates and anchoring medium-term inflation expectations close to the target of 3% (Figures 2-4).

Figure 2.

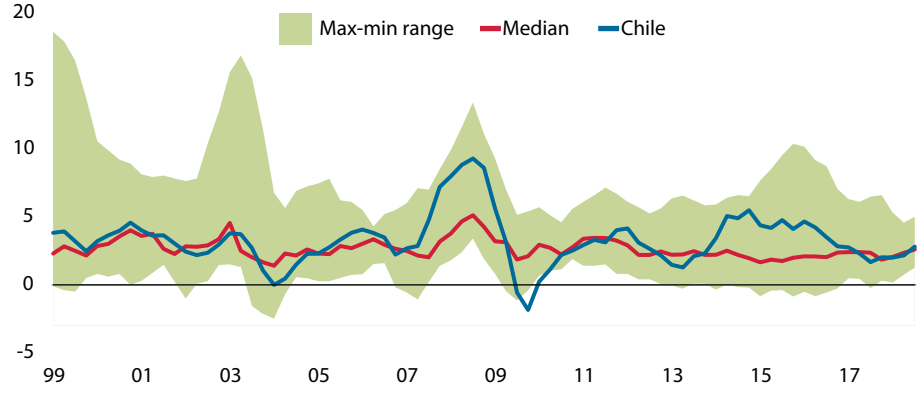
Headline inflation since the adoption of Inflation Targeting.



Note: 12-month CPI inflation in percent, 1/1999-8/2019. The gray area marks the range of ±1 percentage point around the 3% inflation target. Source: BCCh.

Figure 3.

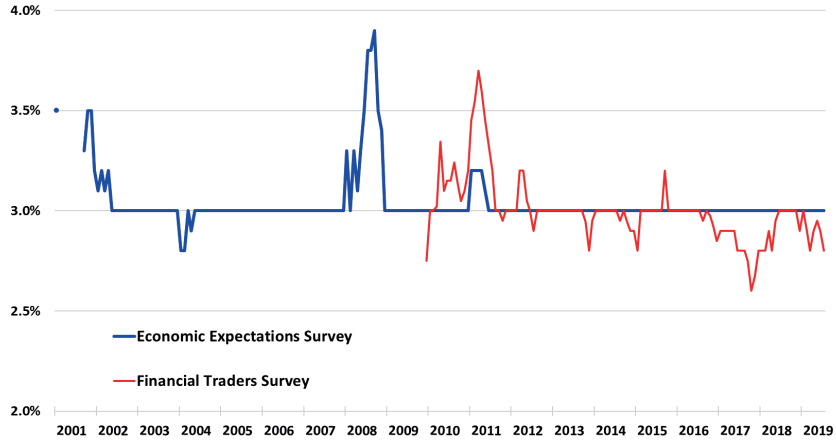
Headline inflation in Chile and in other inflation-targeting economies.



Note: Year-on-year headline inflation in percent, 1999Q1-2018Q3. Max-min range and median for other inflation targeters, including Australia, Brazil, Canada, Colombia, Israel, Mexico, Norway, New Zealand, Peru, South Africa, Sweden, and the UK. Source: National central banks.

Figure 4.

Medium-term inflation expectations.



Note: Median survey responses for two-year-ahead CPI inflation expectations. Sample: 1/2001, 9/2001-7/2019. Source: BCCh.

The implementation of monetary policy is affected by the BCCh's legal prohibition on acquiring public debt securities, so, unlike other central banks, it cannot engage in standard open market operations involving Treasury bills and bonds, not even repurchase agreements (repos), as they involve a purchase. Due to its negative net worth, however, the BCCh has large financial liabilities with the private sector, in the form of a variety of discount promissory notes (PDBC), peso-denominated bonds (BCP) and bonds indexed to UF (BCU), amounting to a total of 7% of GDP in 2018. As these debt payments fall due, a regular supply of liquidity is provided to the banking system. On the other hand, new debt issued by the BCCh can drain any excess liquidity. Thus, through its debt payments and issuance the BCCh is able to gradually adjust the net supply of funds in the interbank market.

In addition to these structural open market operations, the BCCh can use fine-tuning operations to keep the overnight interbank rate close to the monetary policy rate.[12] These are mainly repos of appropriate collaterals (including mortgage bills issued by banks) and liquidity deposits, which are offered at the monetary policy rate. Furthermore, fluctuations in the overnight interbank rate are limited by the BCCh's standing liquidity and deposit facilities, which are offered at the monetary policy rate plus 25 basis points and minus 25 basis points, respectively. The standing liquidity facility is operated through repos and also, since December 2017, using Chilean Treasury bonds in peso (BTP) or UF (BTU) as collateral (*see BCCh Annual Report 2017*, p. 21), in similar fashion as line of credit with collateral (LCC) fine-tuning operations.[13]

Despite facing a ban on using a standard central banking tool, the BCCh has managed to keep the interbank rate very close to the monetary policy rate. In fact, according to *BCCh Annual Reports* the absolute deviation has been zero in recent years.

[12]/ See BCCh (2012) for a detailed description of its monetary operating tools.

[13]/ Since the collateral remains in the counterparty's account with the Central Securities Depository, it does not constitute a purchase by the BCCh.

The formulation of monetary policy relied on New Keynesian and satellite models, the latter being especially designed to keep track of micro- and macro-prudential issues relevant for the Chilean economy. In a few occasions the BCCh has intervened in the foreign exchange market but not in a major way (more on this below), and in all cases central bank independence has been kept intact. The execution of this overall policy framework succeeded in getting rid of double-digit inflation rates and anchoring medium-term inflation expectations to around 3%. This outcome has also been a consequence of strict fiscal discipline based on fiscal rules (e.g., the General Government Net Debt was less than 10 percent of GDP in 2018; IMF *World Economic Outlook* (*WEO*) data), the deepening of financial markets, and was aided by unprecedented global deflationary conditions.

Despite Chile's macroeconomic success, the economy has not been immune to systemic shocks (e.g., the Russian 1998/9 crisis and the Global Financial Crisis (GFC)). The Chilean economy did not perform much better than comparable regional economies over these crisis episodes. For example, while the current account rise between 2008 and 2009 that took place in Latin American and the Caribbean overall was virtually nil, that of Chile was almost 6 percent of GDP. Moreover, in Peru (a copper-dependent economy as Chile) the current account rise reached 5 percent, while in Colombia and Brazil (also commodity dependent economies) it reached around 4.5 and 0.3 percent, respectively (IMF *WEO* data). The current account adjustment in Chile during the GFC was particularly painful because the fiscal balance fell by 8 percent of GDP in the period 2008/9, which coupled with the 6 percent improvement of the current account mentioned above, implies an increase in the private-sector current account of about 14 percent of GDP! This helps to explain why growth went down from 5.5 percent in 2006/7 to around 1 percent in 2008/9.

3.2. Restrictions on the Use of Crisis Interventions Tools

The BCCh's Basic Constitutional Act (LOC) prevents the BCCh from financing the government either directly or indirectly (see Section 27 to the LOC; footnote 6 of this report). As a result, the BCCh is unable to hold domestic public debt instruments in its balance sheet, which puts bounds on its ability to engage in unconventional monetary policy through open market operations (OMOs), including QE through large-scale purchases of Treasury bonds, as used by the US Federal Reserve (Fed) and the Bank of England during the GFC.

In the post-Lehman crisis, the BCCh employed a number of tools to counter the deflationary effects of credit market disruption and global recession. The BCCh temporarily expanded the collateral pool by including commercial banks' term deposits. In addition, it cut rates aggressively from 8.25% to its effective lower bound of 0.5% and gave forward guidance that rates would be kept at this level "for a prolonged period." It reinforced this guidance with a term liquidity facility (*Facilidad de Liquidez a Plazo*, or FLAP) to supply liquidity to banks (on demand, against collateral) at a fixed rate of 0.50% for 90 to 180 days.[14] It suspended its issuance of debt securities of one year or longer through the end of 2009 to help reduce longer-term interest rates. Céspedes et al. (2014) found that the additional measures were effective in that they reduced medium term yields by up to 30-50 basis points and banks borrowing FLAP funds increased consumer and business loans. Still, as noted, the economic growth decelerated markedly, the BCCh is limited in its tools, and *the Panel recommends that it and the government consider how to reinforce the tools it used and whether other tools might also be utilized in a very serious crisis that might be marked by a sudden stop in capital inflows.*

[14]/ The BCCh's issue schedule of discountable promissory notes (PDBC) at maturities less than a year was adjusted in line with that.

The restriction on acquiring public debt instruments is partially relaxed by the fact that the BCCh is allowed to lend to commercial banks using some Treasury obligations as collateral (through the standing liquidity facility and the LCC, as noted in Section 3.1) and, furthermore, could indirectly be exposed to risks of non-performing public debt on account of the BCCh's role as lender of last resort. Therefore, although the BCCh is independent of the Treasury's financial difficulties under normal circumstances, the shield may fail to hold as tightly in case the Treasury runs into serious financial difficulties (see the experience of Argentina with a similar regulation in the 1970s/1980s; Calvo, 1986). *The Panel believes that presently these are low-probability events in the case of Chile given its strong fiscal stance, but they should not be dismissed. The global economy is still giving rise to strong and highly unpredictable shocks that sooner or later are likely to hit the fiscal balance, and these risks should be taken into account in the implementation of the counter-cyclical capital buffer (CCyB).*

Fortunately, the BCCh has several alternatives to QE: (1) FLAP, (2) buying back the BCCh's own debt (although the stock of this debt has declined from nearly 30% of GDP in 2000 to 10% in 2008 and 7% in 2018), (3) swapping (through long-dated repos) its own debt for toxic assets held by commercial banks, and (4) implementing OMOs by purchasing or selling foreign exchange, which, leaving aside gold holdings, boils down to intervening in the foreign exchange market (swapping international reserves for cash). However, alternative (3) could impinge on the independence of the Central Bank because it has a potentially large fiscal and quasi-fiscal component and could worsen the negative net worth of the Central Bank. The effectiveness of alternative (4) could depend on the BCCh's willingness to use flexibility in the mode and tactics of intervention. In the past, the total amount of foreign exchange intervention was made public in advance, including the mechanics of the program. Under some circumstances, e.g. *sudden stops,* different tactics of intervention may be more effective.

Some BCCh documents show that holding of international reserves is motivated by liquidity considerations that arise, especially, during *sudden stop* episodes.[15] This makes perfect sense because the empirical evidence suggests that holding of international reserves reduces the cost and probability of *sudden stops* (see Calvo, 2016). Cushioning the deleterious effects of *sudden stops* involves large sums of foreign exchange that have to be made available to the private sector on short notice. *The Panel recommends that the BCCh reviews its assessment of the adequate level of foreign exchange reserves based on severe* sudden stop *scenarios.*

Fortunately, during the GFC the BCCh found a strong partner in *BancoEstado* (BE), that was able to generate a large increase in credit flows as a result of (1) the government increasing its capital by USD 500 million, and (2) being the main financial institution that the government employed to implement a sizable fiscal stimulus package. Both (1) and (2) were possible by resorting to the recently created sovereign wealth fund (ESSF).

However, a closer look reveals that there may still be room for improving the BCCh/BE coordination and clarifying the respective role of each institution in times of crisis. Firstly, the BE operates as a public commercial bank and, therefore, gears its credit to development projects, not to offsetting the impact of liquidity shocks (as central banks are supposed to do, and the BCCh LOC makes it explicit). Secondly, commercial banks spend a great deal of time evaluating the creditworthiness of loan projects, something that is very costly (per unit of loan) for loans directed to Small and Medium Enterprises (SMEs). Limited collateral is a typical problem for SMEs, which makes them

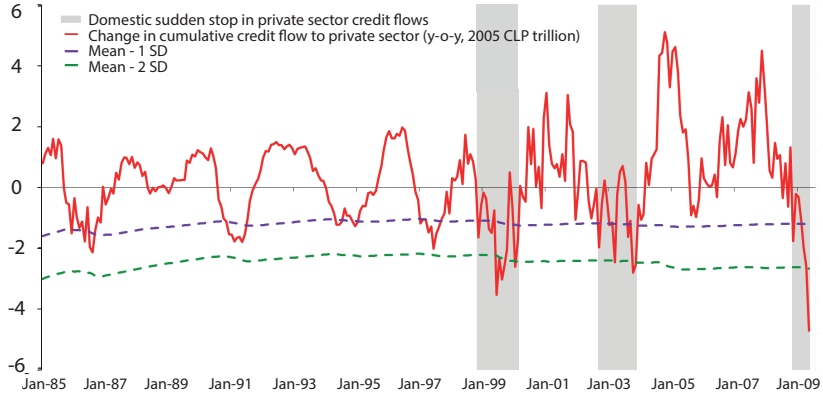
[15]/ For instance, the BCCh's extraordinary dollar swap program announced on 15 December 2017 was motivated by a tightening of interbank liquidity in foreign currency due to increased currency hedging operations (BCCh Annual Report 2017, p. 90).

more susceptible to crunch and credit flow droughts unrelated to their own fundamental solvency factors. All of this helps to explain why BE credit was mostly directed to large enterprises and not to SMEs (see Lagos and Tapia, 2014), which may have had a limited effect in restoring liquidity shortage, and why there was a sizable contraction of domestic credit flows to the non-financial sector (which reached almost three standard deviations at the turn of the 2009s, see Figures 4 and 5)—despite the large growth rate of BE credit flows. *The BCCh, the BE and the Ministry of Finance should consider ways to better ensure the availability of credit to SME's during crises* (e.g. using an improved version of the guarantee fund for SME's (*Fondo de Garantía para Pequeños Empresarios,* or FOGAPE)—a fund with Ministry of Finance guarantees).

Another explanation for the sharp contraction of credit during the crisis, as Figures 5 and 6 show, is that it was preceded by a credit boom that, although smaller than the contraction, suggests the possible relevance of implementing macroprudential policies.

Figure 5.

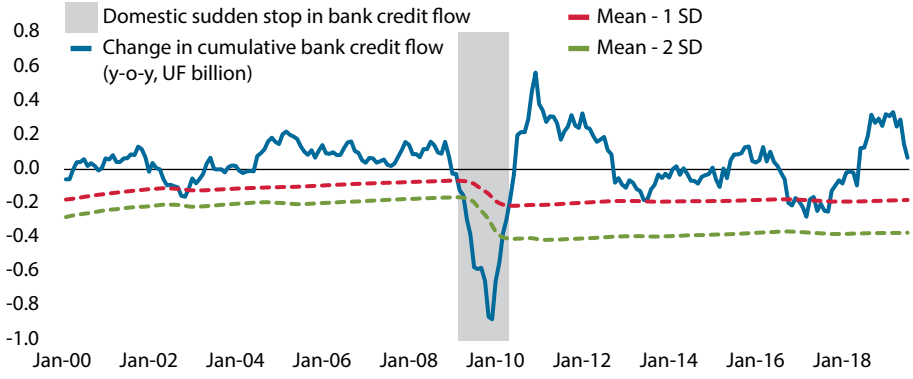
Private sector credit sudden stop.



Note: Year-on-year change in 12-month cumulative credit flow to private sector, with monthly credit flows deflated using Chilean CPI (base year 2005). Source: Guillermo Calvo's calculation on IMF International Financial Statistics (IFS) data.

Figure 6.

Bank credit sudden stop.



Note: Year-on-year change in 12-month cumulative bank credit flow, with monthly change in total bank loans in billion UF. Sample: 1/2000 - 6/2019; from 1/1998 for mean and standard deviation (SD). Source: BCCh calculations using BCCh data.

3.3. Relevance and Role of Exchange Rate Reserves and FX Policy

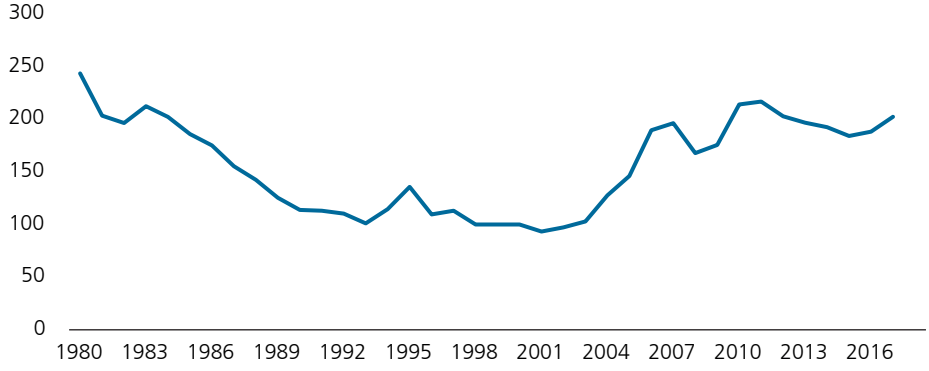
The BCCh could improve and clarify its policy regarding international reserves, especially in crisis times. During the GFC, for example, international reserves were lent to the banking system by the BCCh and the BE expanded credit significantly, even though there were no explicit coordination rules between the BCCh and the Ministry of Finance. This may have deterred the effectiveness of this policy, as BE is akin to a development bank, while during the GFC the BCCh policy was largely aimed at alleviating liquidity shortage conditions, as illustrated by FLAP. Limited coordination between these institutions during crisis times is a plausible conjecture because explicit coordination at that early stage of inflation targeting in Chile may have sent a signal that central bank independence was temporarily abandoned, which could have put a serious dent on BCCh credibility. Fortunately, this has not impeded the BCCh from carrying out a satisfactory inflation targeting policy, but it is worth noting that the positive outcome owes to the BCCh's policies as well as to a combination of factors outside the BCCh's control. For example, (a) Chile's low public debt and fiscal deficit; (b) the use of the ESSF, and (c) the large liquidity infusion from global central banks in 2008/9 (e.g., Fed, Bank of England, European Central Bank, Bank of Japan) that helped relieve and, in some cases, prevent *sudden stop* in many emerging markets , especially in Latin American and Caribbean countries during that episode.

Favorable factors (a) and (b) and (c) cannot be counted on in the future.[16] Moreover, one cannot discount severe financial problems arising in key emerging market economies (e.g., Turkey) that in the past have produced contagion in several similar economies (e.g., the Russian 1998 crisis that caused severe effects in Chile and a large number of emerging market economies).

Recent global regulations in advanced economies have given incentives to move risky assets out of commercial banks, which may make it more complicated to deal with a financial crisis in the future, leaving emerging market economies much more on their own, enhancing the relevance of international reserves. *This leads the Panel to advise the BCCh to make a careful analysis of the potential needs of international reserves under various scenarios, including* sudden stops, *and, especially, explicit mechanisms to deploy them when necessary.*

Figure 7.

Chile's Terms of Trade.

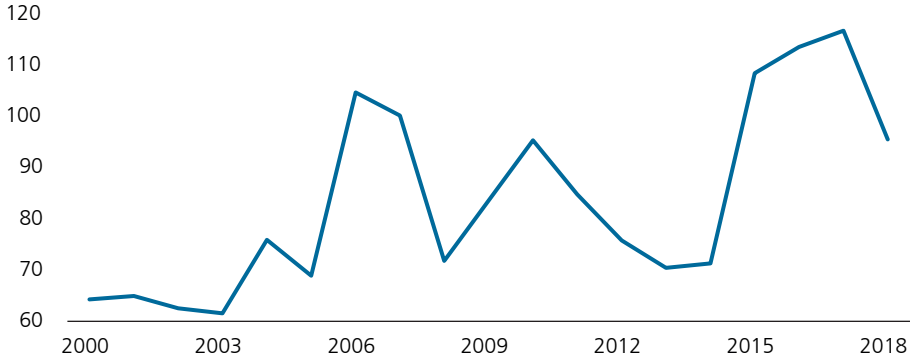


Note: Base year 2000. Sample: 1980-2017. Source: World Bank.

[16]/ Moreover, threats of instability persist. For example, a recent speech by Fed Chairman Powell shows serious concern about highly leveraged loans to non-financial corporations, while a report by Fitch Ratings shows that global shadow banks' assets have reached USD 52 trillion as of fiscal year-end 2017, a 8.5 percent increase year over year.

Figure 8.

Copper/Oil Prices.



Note: US$ per metric tonne/US$ per barrel. Source: IMF WEO data.

The conventional New Keynesian model abstracts from credibility issues and intervention in the foreign exchange market through using ESSF or international reserves—and focuses on the use of a policy interest rate to achieve the inflation target. This type of model has probably been relevant for Chile since 2000, given that the GFC in emerging market economies was short-lived and Chile's terms-of-trade shocks that marked the end of the commodity super-cycle were relatively mild and also short-lived (see Figures 7 and 8). However, liquidity shocks (e.g. a consequence of worsening global conditions) cannot be dismissed. History shows that liquidity shocks can have a severe impact on emerging market economies, debilitating the credibility of policymakers as they are difficult to communicate. A recent paper (see Calvo, 2018) shows that under policymakers' weak credibility the interest rate may not be a strong nominal anchor and may need to be buttressed by, e.g., targeting monetary aggregates and/or engaging in active foreign exchange intervention. In some cases, these anchors might involve heterodox arrangements. An example is Brazil during the 2002 (at the beginning of President Lula's first term in office) and 2008 (GFC) episodes in which the government directed credit flows to sectors strapped by dollar liquidity constraints—a policy widely judged successful (at least in the short run).

3.4. The Role of the UF

The UF is a unit of account close to the CPI that is widely used in medium-term financial contracts. It is credited with the expansion of the mortgage market, in consonance with the creation of a fully funded capitalization pension system (AFP system), in 1980. The UF helped to mitigate the mismatch between AFP's long-term obligations and assets, which could be severe in the medium term under high inflation volatility. In addition to expanding the span of the domestic capital market, the UF helps to prevent self-fulfilling high-inflation equilibriums. The latter take place when the credibility of the inflation target is diminished, the market expects much higher inflation than the target and, as a result, the domestic nominal interest rate rises sharply. As shown in Calvo (1988), this could lead to temporarily abandoning targeting inflation if, as a result, the fiscal deficit as a share of GDP reaches unsustainable levels, or massive private-sector bankruptcies occur. In contrast, UF indexed contracts are free from this problem because *ex post* nominal interest rates would be high *only if*

inflation turns out to be high. Thus, the Central Bank will not be barred from pursuing inflation targeting because, to the extent that inflation is kept within reasonable bounds around the target, the fiscal/private sector problems highlighted above would not arise—and incentives to generate high inflation would be prevented. However, UF indexation may create serious problems if the economy is hit by shocks that call for a sizable change in relative prices, e.g., the real exchange rate or the real wage. This is a typical outcome in *sudden stop* episodes. To illustrate, consider a household that took an UF indexed mortgage, and the household's real wage falls sharply (30 percent is not unusual in *sudden stop* episodes). Since the UF is highly correlated to the CPI, the household may go bankrupt, unless the government intervenes and changes the terms of the mortgage contract *ex post*. It is clear that whatever the outcome this sort of situation will rapidly move the debate to the political arena and may even lead to ditching financial indexation.[17]

Fortunately, Chile appears to have overcome these difficulties, despite being subject to *sudden stop* shocks in 1998/9 and 2008/9. However, the *Panel suggests keeping track of these potential difficulties and contingencies (e.g., increase in household vulnerabilities, systemic* sudden stop *episodes), and take them into account in the design of CCyB.*

3.5. Assessment and Implications

After the 1998 crisis, Chile's macro/monetary policy management has been exemplary for emerging market economies' standards, and able to keep inflation expectations firmly anchored at levels that seemed unthinkable before. However, the economy has not escaped financial crisis. In fact, output contraction is large in comparison with, for instance, Colombia and Brazil.

Chile has been able to handle terms of trade deterioration as well as in those economies, and without losing its grip on low inflation expectations. However, the Panel is concerned that there are future risks that may make it more difficult to keep the economy on a stable path.[18] This could be a serious shock if a *systemic sudden stop* accompanies the China-US trade conflict, given that global central banks are likely to be less predisposed to offset an emerging economies liquidity crunch.

Thus, although Chile's regulatory framework is exemplary for emerging economies' standards, there are still some aspects that merit attention, especially those that help to stave off *sudden stop* and its consequences. These aspects include management of international reserves and open market operations, including coordination between the BCCh and BE. Unlike normal shocks, sudden stops involve several government branches at the same time. Thus, it may be risky and jeopardize their effectiveness to keep these branches operating separately during liquidity crises. This should not imply giving up BCCh independence in normal circumstances but, to avoid serious misunderstandings, it may be necessary *to draw a clear dividing line between "normal" and "liquidity crisis/*sudden stop*" periods—the latter possibly necessitating close coordination among the different government branches, especially the BCCh and the Ministry of Finance.*

[17]/ This happened in Argentina and Colombia in the 1980s and is presently taking place in Argentina where, as a result of the crisis, the government issued a decree freezing indexation on several financial contracts until December 2019.

[18]/ In particular, there is a concern that an exacerbation of the China/US trade war may bring about a sharp deterioration of Chile's (and Peru's) terms of trade, since the latter are still much higher than in 2000 (the beginning of the commodity super-cycle).

4. MONETARY POLICY COMMUNICATIONS

The communication of monetary policy is important for several reasons. First, it enables public accountability, which is vital for an independent central bank like the BCCh to maintain its democratic legitimacy. So, central banks are generally subject to formal disclosure requirements. For the BCCh, these are stipulated in its Basic Constitutional Act (LOC) and they are reviewed in Section 4.1.

Moreover, greater transparency through central bank communications usually makes monetary policy more effective.[19] In particular, the publication of an explicit inflation target, which the BCCh has done since 1991, facilitates the anchoring of medium-term private sector inflation expectations, which makes it easier to achieve the target.

In addition, monetary policy explanations and analyses published by the central bank, including its macroeconomic projections, enable the private sector to assess the appropriateness of monetary policy actions. This allows the central bank to enhance the credibility of its inflation target, which makes inflation expectations more stable and thereby reduces inflation volatility.

Furthermore, greater transparency through monetary policy statements, reports, minutes and speeches makes it easier for the private sector to understand the central bank's monetary policy reaction. Thus, it increases the predictability of monetary policy actions. Since anticipated decisions are reflected in financial asset prices, they already start exerting their effects before they have even been implemented, thereby speeding up the transmission of monetary policy.

Last but not least, the publication of its models, forecasts, analyses and policy discussions exposes the BCCh to outside scrutiny and gives its Board and staff an incentive to ensure these are of high quality, thereby improving its monetary policymaking.

As a result, it is not surprising that monetary policy transparency generally goes well beyond formal disclosure requirements. The main communication tools used by the BCCh are the monetary policy meeting (MPM) statement and minutes, the Monetary Policy Report (MPR), and presentations by Board Members, which are all reviewed in Section 4.2. Special attention is given to the communication of the BCCh's macroeconomic projections and forward policy guidance in Sections 4.3 and 4.4. An overall assessment of the BCCh's monetary policy transparency is provided in Section 4.5.

In line with the remit of the evaluation, the main focus in this chapter is on monetary policy communications in recent years. Claussen (2017) provided a fine review of the BCCh's monetary policy communications and transparency. He considered the significant changes to the MPM press release and minutes, and to the timing of the MPR release that the BCCh had announced in September 2017,[20] but these only took effect in January 2018. So, in this evaluation we pay special attention to the way in which the BCCh has implemented these changes, and the experience with the BCCh's new communications regime for monetary policy since 2018.

[19]/ See Geraats (2014) for a recent overview of theory and evidence on this.

[20]/ The announcement was made in the September 2017 MPR (pp. 11-12) and in an accompanying document (BCCh, 2017), although the changes have not been fully implemented as announced.

4.1. Formal Disclosure Requirements

The BCCh is subject to formal disclosure requirements that are stipulated in the BCCh's LOC. According to Section 4 of the LOC,

> *"The Bank shall inform the President of the Republic and the Senate with regard to the policies and regulations of general applicability issued by the Bank in the performance of its duties."*

The LOC also specifies that it is the responsibility of the Governor to do so; this is explicitly included in the list of the Governor's duties in Section 22 (item 4). In addition, Section 67 states that the *"Bank shall publish […] all resolutions or decisions of general applicability, as well as those which, in the opinion of the Board or any of its Members, require public knowledge."* So, the BCCh is required to publish its monetary policy decisions, and the Governor has to keep the President and Senate informed about them.

Furthermore, Section 80 of the BCCh's LOC stipulates that:

> *"Prior to September 30 of each year, the Board shall submit to the Minister of Finance and to the Senate an evaluation of the progress made regarding the policies and programs for the current year, together with a report on proposed policies and programs for the next calendar year, stating the general economic projections on which such information is based and the possible effects they may have on major items in the financial statements of the Bank projected for such period."*

It is very unusual for a central bank to have a requirement of constitutional status to provide proposed monetary policy for the next year (i.e. forward policy guidance), general economic projections, and a projection for major items in its financial statements. The BCCh uses the September Monetary Policy Report to meet the demands set out in Section 80.[21]

The Bank is also required to *"prepare an annual report describing the activities performed in the previous year, providing information on the implementation of policies and programs carried out in such period, including the financial statements"* (Section 78), and it has to be published before April 30 each year (Section 79), which all holds for the *BCCh Annual Report.*

The LOC (Section 53) also makes it a formal function of the BCCh to compile and publish the main macroeconomic statistics in a timely fashion,[22] which is not commonly a responsibility of central banks.

[21]/ The Preface of every Monetary Policy Report states that "In accordance with Article 80 of the Bank's Basic Constitutional Act, the Board is required to submit this report to the Senate and the Minister of Finance." Section 80, however, implies an annual requirement that only pertains to the September Monetary Policy Report, which includes an appendix that provides projections for major items of the BCCh's balance sheet. Nevertheless, the Board decided to also submit its other Monetary Policy Reports, which is in line with the Section 4 requirement to inform the Senate with regard to its policies.

[22]/ According to Section 53 of the BCCh's LOC: "The Bank shall timely compile and publish the main macroeconomic statistics, including those of a monetary and foreign exchange nature, balance of payments and national accounts, and other overall economic and social accounting systems."

The BCCh's LOC was amended in August 2008 to further increase its disclosure requirements, following Chile's new Law on Transparency of the Public Service and Access to Information on State Administration. According to the newly added Section 65 bis of the LOC, the BCCh *"is governed by the principle of transparency in the exercise of public functions"*. This principle, which is enshrined in Chile's Constitution, is wide-ranging and applies not only to the BCCh's policy decisions, but also to their foundations and supporting documents, although exceptions exist to ensure the achievement of the BCCh's objectives is not endangered. See Appendix 4 for further details.

The BCCh fulfills its formal disclosure requirements with respect to monetary policy mainly through the press release after the MPM and the Monetary Policy Report, including the Governor's presentation of the Report to the Senate, which are all discussed next.

4.2. BCCh Communication Tools

This Section reviews the BCCh's main communication tools for monetary policy: the statement released after the MPM, the Monetary Policy Report, the MPM minutes, and presentations by Board Members (including testimony before the Senate and press conferences). Other communications related to monetary policy (including the *Annual Report* and other documents) are considered as well.

4.2.1 Monetary Policy Meeting Statement

After each MPM, the BCCh publishes a press release with a statement by the Board that announces the policy decision and provides an explanation of it. The MPM statements have significantly improved since January 2018, as announced in the September 2017 Monetary Policy Report (pp. 11-12), and further explained in an accompanying document (BCCh, 2017).

Before the change, the MPM statement was usually only one page long. It stated the monetary policy decision and provided a terse summary of global and domestic macroeconomic developments, often referring to the forecasts or 'baseline scenario' in the most recent Monetary Policy Report. In addition, it sometimes included qualitative forward policy guidance, usually in the form of a conditional statement that indicated the likely future policy direction. It also generally stated the Board's "commitment to conduct monetary policy with flexibility, so that projected inflation stands at 3% in the policy horizon".

Although the statement provided some explanation of the policy decision by referring to current and prospective macroeconomic developments, it was short on details and full of references to previous quarters or trends, or the baseline scenario and projections from the last Monetary Policy Report. Overall, the monetary policy statement did not give a comprehensive, accessible explanation of the decision.

After the decision-making and communication changes implemented in January 2018, the MPM statement has been much more extensive. It more than doubled in size and is now usually approximately 750 words long, compared to around 300 words previously. Although the reduction in the frequency of MPMs from 12 to 8 times per year naturally means that more macroeconomic and financial news has now arisen since the previous MPM, the increase in the length of the

statement is clearly more than proportionate. Moreover, the quality of the discussion of recent developments has greatly improved and is now more detailed.

Overall, the monetary policy statement is now much more informative and provides a far better explanation of the policy decisions than previously. There are still frequent references to previous trends and the baseline scenario or projections from the last Monetary Policy Report, but more background is now provided, making the statement more accessible. Nevertheless, the statement, often unnecessarily, relies on jargon and abbreviations that non-specialists are unlikely to be familiar with, which limits its accessibility. With some rephrasing, however, the monetary policy statement could become easier to understand to a wider audience.[23]

Since January 2018, the MPR release schedule has been aligned with the MPM schedule such that the Report is published one business day after the MPM statement. Although this is a significant improvement (as discussed in section 2.2), it gives rise to a communications problem. When the Report is published (in March, June, September and December), it makes sense for the Board to refer to its contents in the MPM statement, before the Report has been released. For instance, the monetary policy statement of Friday 7 June 2019 that announced a 50 basis point rate cut referred extensively to the Report that was published on Monday 10 June. *The Panel recommends publishing key information from the Monetary Policy Report, including the macroeconomic projections, at the same time as the policy announcement. Other material from the Report that is pertinent to the monetary policy decision should be provided as well* (such as the BCCh's revision of key structural parameter estimates in June 2019). Ideally, the entire Monetary Policy Report is published on the same day as the policy announcement, so that all relevant information is available.

Following the changes in January 2018, the MPM statement usually includes some qualitative forward guidance in the form of a conditional statement about the likely direction of the next monetary policy move, which provides useful information.

Furthermore, the MPM statement now includes the individual voting record, which previously was only disclosed in the minutes that are published 11 bank working days after the MPM. Immediately disclosing the voting balance is useful for two reasons. The number of dissents indicates to what extent the decision was a close call due to conflicting macroeconomic or financial signals, or different views among Board Members on how to interpret them. This provides valuable information to better understand the BCCh's monetary policy reaction. Furthermore, the direction of the dissent is a useful predictor of upcoming monetary policy adjustments. For instance, a decision to hold the monetary policy rate with a dissent in favor of a rate cut is often followed by a rate cut in one of the upcoming policy meetings.

The BCCh, however, usually makes its monetary policy decisions by unanimity. In fact, there has been dissent at only 9% of the MPMs since 2000 (when there has been full-fledged inflation targeting). It is unusual for central banks to display such a high degree of unanimity in their monetary policy decisions.[24] Most of the dissenting votes by BCCh Board Members were against a decision to hold the policy rate constant, and in around two-thirds of these, there was a policy rate adjustment in the direction of the dissent within three meetings. So, dissenting votes by BCCh Board Members against no-change decisions have been a leading indicator of upcoming policy adjustments.

[23]/ For instance, writing out or implicitly explaining abbreviations when they are first used would already help (e.g. instead of simply referring to "CPIEFE inflation", "consumer price inflation excluding food and energy (CPIEFE)" could be used when first mentioned).

[24]/ See Appendix 5 for an international comparison and a further analysis of BCCh dissents.

In addition to conventional monetary policy decisions about the policy rate and forward guidance, the post-meeting statement has also been used by the BCCh to announce unconventional monetary policy measures. During the global financial crisis, the BCCh slashed the monetary policy rate in several decisive steps from 8.25% at the start of 2009 to 0.50% on 9 July 2009, reaching its effective lower bound. The post-meeting statement provided forward guidance that the policy rate would be kept at this level "for a prolonged period". Furthermore, it announced "complementary monetary policy measures" including the term liquidity facility FLAP to reinforce this (see Section 3.2 for details).

The MPM press release is published at 6 PM local time on the BCCh website in both Spanish and English, although the latter may be released with a delay of several minutes. Since the monetary policy decision is announced while financial markets in Chile are closed, it is not possible to analyze its immediate impact on financial asset prices. This deprives the BCCh of a valuable opportunity to examine the informativeness of its policy statement. Although the change in asset prices at the opening of financial markets the next business day incorporates the BCCh's policy announcement, it is also affected by overnight developments in international financial markets. This is exacerbated by the fact that monetary policy decisions are sometimes announced on a Friday, leaving an entire weekend in between. *Thus, the Panel recommends that the monetary policy meeting statement is released during financial market trading hours, so that the BCCh can more accurately monitor the market reaction to its policy announcement and its effect on market expectations inferred from financial asset prices.*

4.2.2 Monetary Policy Report

The BCCh first published its Monetary Policy Report (called *Informe de Política Monetaria* or, more snappily, *IPoM* in Spanish) in May 2000, after moving to full-fledged inflation targeting in September 1999. It has been the BCCh's main communication tool for monetary policy and one of its objectives (as stated in its Preface) is to inform and explain the Board's views on monetary policy to the Senate, the Government and the general public. The MPR analyzes external and domestic macroeconomic and financial developments that are relevant for monetary policymaking. Furthermore, it provides the BCCh's macroeconomic forecasts, including medium-term projections for inflation and GDP growth.

During its first decade, the Monetary Policy Report was published three times per year. But since December 2009, it has been released at quarterly frequency, in March, June, September and December. This provides an improvement in transparency because the BCCh now provides an update of its medium-term macroeconomic forecasts for each quarterly batch of national accounts data.

The release of the Report used to be unrelated to the MPM but determined by the Governor's testimony before the Senate and announced only one month in advance. Since 2017, however, the release schedule for the next calendar year has been announced in September. Furthermore, it has been synchronized with the MPM schedule such that since January 2018, the Monetary Policy Report has been published at 8:30 AM one business day after the monetary policy announcement. Shortly afterwards, the Report is presented by the Governor before the Senate and subsequently at a press conference.

The structure and contents of the Monetary Policy Report has been the same in recent years, except for a notable change that started in September 2018, when the contents of some chapters were reshuffled and refocused, and the Report became significantly longer. It is now usually around 60 pages long, compared to 45 pages previously, except for September Reports, which tend to be around 10 pages longer due to additional appendices.

The Monetary Policy Report starts with a one-page Preface, a Summary of 4-5 pages, and a two-page summary account of "Monetary Policy Decisions in the Last Three Months". Then it has the following chapters (since September 2018):

I. International Scenario: This analyzes recent developments in the world economy, the medium-term outlook, and the balance of external risks.

II. Financial Conditions: This reviews developments in domestic and external financial conditions.

III. Output and Demand: This chapter reviews the development of output and demand, and their short-term outlook.

IV. Prices and Costs: This chapter analyzes recent developments in the main components of inflation and costs, identifying the current sources of inflationary pressure and their likely future development.

V. Future Monetary Policy Evolution: This chapter presents the Board's assessment of the medium-term outlook for GDP growth and inflation, including quarterly projections under the baseline scenario. It also discusses risks by considering the effects under some alternative scenarios.

The September Monetary Policy Report also includes three appendices, which fulfill the requirements set out in Section 80 of the BCCh's LOC:

A. The Central Bank of Chile's Balance Sheet: This presents the BCCh's balance sheet, including projections for the current and next calendar year.

B. International Reserve Management: This provides a detailed account of the BCCh's international reserves, including level and composition (by currency and type of asset).

C. Main Measures Taken by the Central Bank of Chile in [the current calendar year]: This simply lists all monetary policy decisions and some other Board Resolutions.

In addition, each Monetary Policy Report usually includes several Boxes that provide more detail on often topical issues that are relevant for monetary policymaking in Chile (e.g. exchange rate pass-through to prices, mining productivity and immigration in Chile). They tend to be informative and provide useful background.

The BCCh publishes a summary version of the Monetary Policy Report in English, consisting of the Summary section and Chapter V. The English translation of the full Report is released with a

delay that has varied over time; it was only two weeks in 2015, but currently the delay is usually around a month. Although Chapters I through IV contain material that economic analysts in Chile are generally familiar with, that is less likely to be the case for others. So, *the Panel recommends reducing the current substantial delay in the translation of the full Monetary Policy Report to provide a timelier account in the language of international financial markets and make the Report more accessible to foreign analysts and investors.*

The Claussen (2017) review recommended that the full Report be published in Spanish and English at the same time. In practice, however, it takes significant time to produce an accurate translation, although developments in machine learning may greatly speed up this process, especially for a document like the Monetary Policy Report, which mostly contains similar contents each time. But in the meantime, it would be undesirable to publish the English version at the same time by delaying the release of the Spanish original (or preparing it much earlier), because it would negatively affect its main intended audience in Chile (as well as monetary policymaking, which would be based on less timely analysis).

The Summary section of the Monetary Policy Report provides a summary of recent macroeconomic developments. In addition, it presents a table with annual forecasts for inflation and the growth of output and some expenditure components for the current and the next two calendar years (before 2018, the current and next calendar year). The forecasts are all point estimates, except for GDP growth, where a forecast range is provided of usually one percentage point. The baseline scenario assumptions for some international variables (such as terms of trade, world GDP, commodity prices and US short-term interest rate) for the current and next two calendar years are detailed in a table. For other variables, however, the working assumptions in the baseline scenario are only described verbally, including for the monetary policy rate and public spending, or not at all. Furthermore, the Summary discusses the risks to the baseline projections. The quarterly projections for CPI and core (CPIEFE) inflation for a three-year horizon (before 2019 for a two-year horizon) are each presented in a fan chart that illustrates the risks to future inflation. In addition, a qualitative balance of risk assessment is provided for the external environment, domestic economic activity and inflation.

A notable omission in the Summary is that it does not include quarterly projections for GDP growth. A fan chart illustrating the projected dynamics and underlying uncertainty for this key variable would be a useful complement to the inflation fan charts. In addition, the varying order in which the tables and the working assumptions for the baseline projections are presented could be given more thought. Nonetheless, since the release of the Monetary Policy Report has been synchronized with MPMs in 2018, the Monetary Policy Report Summary provides an essential complement to the MPM statement by providing much more detailed information about the Board's views on macroeconomic prospects, which are vital for understanding the monetary policy decision. Unfortunately, this Summary is only published one business day after the MPM statement. So, *the Panel recommends that the Summary of the Monetary Policy Report includes a fan chart for quarterly GDP projections in addition to the inflation fan charts, and that the Summary (and preferably the entire Report) is released on the same day as the monetary policy decision.*

Each chapter of the Monetary Policy Report starts with an introductory paragraph of one or two sentences that describes the topic of the chapter in general terms. For instance, for chapter II on *Financial Conditions* it currently states "*This chapter reviews the evolution of local and external financial conditions*", which is not very informative. Instead, it would be much more useful to provide a digest that highlights important developments, similar to what the BCCh does in its Financial Stability Reports.

A detailed discussion of the contents of the chapters is provided in Appendix 6(a), including suggestions for improvements. In some cases, recent changes in the Report have led to a loss of insight that should be addressed, for instance about labor costs and other labor market developments, and the components that are driving changes in economic activity. In addition, the June 2019 Monetary Policy Report no longer included any graph showing both CPI inflation and its 3% target, which is a significant omission. The BCCh should make it as easy as possible for people to see to what extent the Bank's price stability objective has been achieved.

The Monetary Policy Report, including chapter IV, analyzes both CPI inflation and CPIEFE inflation, which is a core CPI inflation measure that excludes food and energy prices as they tend to be more volatile and driven by extraneous forces. As a result, the CPIEFE is usually a better indicator of underlying price pressures and future inflation, and the BCCh has much greater control over CPIEFE than CPI inflation.

Since the monetary policy rate has most of its effect on economic activity and inflation with a substantial lag of around one to two years, respectively, their medium-term projections are important. Chapters III and IV briefly mention the short- and medium-term baseline projections for GDP growth and inflation, respectively, and compare them to private sector expectations from the *Economic Expectations Survey* (EES), and for inflation also from the *Financial Traders Survey* (FTS) and market expectations implied by inflation swaps. But the working assumptions underlying the baseline projections are not fully discussed until chapter V, which focuses on presenting and discussing the Bank's medium-term macroeconomic projections. It is hard to interpret the projections without knowing what assumptions they are based on, so it would be better to set out the baseline scenario assumptions before presenting the resulting projections. One way to achieve this is to only discuss private sector expectations in chapters III and IV, and to leave the Bank's projections for chapter V. An alternative, middle way is to present the Bank's medium-term projections in chapter V, but to discuss short-term BCCh projections in chapter III and IV that are based on time-series techniques rather than (semi-)structural models that require many working assumptions about economic variables. This is the approach currently used in the *Inflation Report* of the Bank of England. It has the additional advantage of providing a short-horizon robustness check for the medium-term projections based on the (semi-)structural model(s).

Chapter V of the Monetary Policy Report presents the medium-term macroeconomic projections and discusses the risks affecting them. This chapter has undergone the biggest change of all chapters in September 2018. It has doubled in length, from around four to eight pages. Following the recommendation of the Claussen (2017) review, the horizon of the medium-term macroeconomic projections has increased to three years since 2019,[25] compared to one to two years for GDP growth and two years for CPI and CPIEFE inflation previously. In addition, there is much more discussion of the output gap and economic activity projections in the Report.

Furthermore, there is more focus on the likely path of the monetary policy rate. In particular, chapter V now includes a table with private sector expectations of the monetary policy rate one year and two years ahead from the EES, the FTS and derived from financial asset prices (using interest rates from swap contracts), also in comparison to the previous Report. The survey and financial market expectations of the monetary policy rate are also shown graphically. However,

[25]/ The fan chart with the projection for GDP growth in the March 2019 Monetary Policy Report (Figure V.15) still had a horizon of two years. The three-year horizon was only shown in the Excel spreadsheet on the BCCh website that is supposed to contain the figures in the Report.

private sector expectations for the monetary policy rate are only shown for a two-year horizon, while the GDP growth and inflation projections nowadays have a three-year horizon. *In line with the Panel's recommendation in Section 2.1 to increase the horizon for the EES and FTS surveys, the Report should show private sector expectations for the policy rate and inflation over a three-year horizon because they provide very useful information.*

The medium-term macroeconomic projections for the baseline scenario are based on assumptions, some of which are clearly spelled out (e.g. in the table of international baseline scenario assumptions in the Monetary Policy Report Summary), but others are usually more vaguely described, including the assumed path for the monetary policy rate. The 'working assumption' for the monetary policy rate path in the baseline scenario is often described as 'similar to' or 'in line with' survey or market-based expectations, but sometimes in qualitative terms in relation to it (e.g. 'somewhat higher').[26]

According to the BCCh's document describing its monetary policy framework, however:

> *"The usual working assumption is a policy rule that associates the policy rate with the gap between projected and target inflation, and the output gap. This rule does not attempt to literally reflect how the Central Bank's Board sets the monetary policy rate, but rather to serve as an analytical premise used to project inflation and growth and ensure they are consistent with money's neutrality in the long run."* (BCCh, 2007, p. 22).

This suggests that the 'working assumption' for the monetary policy rate path is just an 'analytical premise' based on a policy rule and that it generally does not correspond to what the private sector or the Board expects it to be.

The Monetary Policy Report used to state in the introductory paragraph of chapter V on *Inflation Scenarios* that "*Projections are presented of the most likely inflation and growth trajectories. These are conditional on the assumptions in the baseline scenario*". So, the projections could simply be interpreted as the most likely outcomes based on the 'working assumption' for the monetary policy rate. Nevertheless, it can easily cause confusion that projections that are advertised as the 'most likely' outcomes use a policy rate path based on a mechanical policy rule that may be quite different from the path of the monetary policy rate expected by the Board (or private sector).

Sometimes, however, the Report gave the impression that the baseline scenario, including its policy rate path, reflects what is 'most likely to occur'.[27] This suggests that the baseline scenario corresponds to unconditional forecasts of the most likely outcomes.

Since September 2018, chapter V of the Monetary Policy Report has been relabeled "*Future Monetary Policy Evolution*" and its introductory paragraph now explicitly states that it "*presents the most likely trajectory for monetary policy over the next two years*".[28] This strongly suggests that the path for the monetary policy rate and the corresponding macroeconomic projections are now indeed the

[26]/ For instance, *"As a working assumption, the baseline scenario in this Report projects that the [monetary policy rate] path will be somewhat higher than in the surveys."* (Monetary Policy Report, March 2015, p. 19).

[27]/ For instance, immediately after describing the 'methodological assumption' for the monetary policy rate path under the baseline scenario (as similar to what "can be inferred from the various expectations indicators") in the December 2015 Monetary Policy Report, it is stated that *"The baseline scenario reflects the events that are believed to be the most likely to occur with the information at hand at the closing of this Report."* (p. 9).

[28]/ Since 2019 the Preface to the Monetary Policy Report also states that the last chapter "presents the most probable path for monetary policy in the next two years".

BCCh's forecast of the most likely outcome. Thus, the policy rate path could be interpreted as being in line with the forward policy guidance that the Board nowadays routinely provides. Nevertheless, the Report still refers to the monetary policy rate path used for the projections as a 'working assumption', which according to the current BCCh monetary policy framework document (BCCh, 2007) is based on a policy rule that does not attempt to accurately reflect how the Board sets the monetary policy rate. The BCCh needs to clarify this issue and adjust its 'working assumption' terminology accordingly because it has become very confusing.[29]

The baseline scenario described in the Monetary Policy Report plays a prominent role in the BCCh's communications. It is frequently mentioned in the MPM statements and minutes, including for meetings when no Report is released. The baseline scenario is often used as a reference point (also in the Report itself). If new developments appear to be in line with the (previous) baseline, the BCCh generally sets monetary policy according to the underlying policy rate path sketched in the Report.

A detailed reading of the BCCh's Monetary Policy Reports and minutes suggests that the Board tends to stick to the baseline scenario and is reluctant to deviate from it when facing uncertain and confounding signals. For instance, it is not unusual for the minutes to conclude that the baseline scenario of the previous Report basically still applies, despite significant new developments. In addition, the Report itself has the tendency to focus on a comparison to the previous Report and downplay changes, instead of taking a step back and making an overall reassessment of the current situation.

In this respect, it is worrisome that the graphs of CPI and CPIEFE inflation (forecasts) in the June 2019 Monetary Policy Report no longer show the last few years, but only go back to 2018. The table of annual inflation (forecasts) in the Report also starts in 2018. Thus, they no longer show that CPI inflation has mostly been significantly below the 3% target since 2017, and that core inflation has been around 2% since early 2017. Although the BCCh Board was no doubt aware of these facts, it could have greatly benefited from trying to explain the 'big picture' question why headline and especially core inflation have been significantly undershooting the 3% inflation target for such a prolonged period. Focusing on such big picture issues could also serve as a useful robustness check, instead of just relying on the medium-term macroeconomic projections generated by the policy models.

The September issues of the Monetary Policy Report include a Box in chapter V on "*Changes in the baseline forecast scenario in the past year*", but the focus is on a comparison of the baseline scenarios in the previous four Monetary Policy Reports, rather than an analysis of how the projections for the baseline scenarios actually performed in comparison to macroeconomic outcomes. In recent years, this Box has included a chart showing the evolution of the medium-term baseline projections for inflation since the previous September Report and a table showing the evolution of the short-term baseline projections for economic activity and its components for the current calendar year, again over the previous four Reports. The Box tends to refer to some macroeconomic and financial developments, but the reason for significant changes in the projections is not always clearly explained.

The BCCh should improve this Box and include a detailed analysis of its past forecast errors, especially for (CPI and CPIEFE) inflation and GDP growth over policy relevant horizons of one, two

[29]/ The BCCh's macroeconomic projections and its forward policy guidance are further discussed in Sections 4.3 and 4.4.

and three years, but ideally also for the main components of economic activity and key external variables (such as the copper price). In addition, the BCCh should compare its forecast errors to those for survey expectations and market expectations based on financial asset prices. Moreover, the BCCh should seek to learn from any persistent forecast errors, either by applying judgement to mitigate them or by adjusting its monetary policy models. It is important to review past forecast errors every year to ensure substantial errors are not repeated but quickly addressed. *In short, the Panel recommends that the BCCh provides an annual review of the forecast errors for its medium-term macroeconomic projections, including a comparison to those for survey expectations (where available) and market expectations based on financial assets prices.*

To its credit, since 2015 the BCCh has provided an annual review of its estimates for trend and potential GDP growth and the output gap in a Box in chapter V, usually in the September Monetary Policy Report. Nevertheless, a more critical analysis of the estimates would be beneficial. For instance, the revised output gap estimates in the September 2018 Monetary Policy Report show a big increase from -1.1% in 2017 to -0.1% in 2018 and 2019, with large upward revisions for 2018 and 2019 (from -1.5% and -0.9%), but there was no attempt to reconcile this with the fact that core inflation had been below 2% for more than a year and indicators of installed capacity utilization also continued to point to spare capacity at the time.

Clearly, significant uncertainty regarding structural parameters such as trend and potential GDP growth and the natural rate of interest can be a major risk to the baseline projections. The final significant change to chapter V of the Monetary Policy Report since September 2018 has been a more detailed discussion of alternative scenarios. Instead of a brief, qualitative description of some risks to the growth and inflation outlook (in the 'Risk scenarios' section), the Report now contains a (relabeled) 'Sensitivity scenarios' section that provides a more detailed analysis of alternative scenarios. It describes how specific changes in the baseline scenario would affect the projections for economic activity and inflation (though not always in quantitative terms),[30] and the path for the monetary policy rate (in qualitative terms only). This is a welcome increase in transparency about the risks faced by the BCCh in its monetary policymaking. It could be further improved by including graphs showing both the alternative scenario and baseline projections for GDP growth and inflation. Moreover, the effect of each alternative scenario on GDP growth and inflation should be quantified, and preferably also the implication for the monetary policy rate path. Otherwise it is not clear whether the effects are likely to be economically significant and relevant for monetary policy settings. *Thus, the Panel recommends that the Monetary Policy Report further improves the communication of risks to the baseline projections, including more explicit quantitative analysis of alternative scenarios.*

In terms of exposition and presentation, the Monetary Policy Report is mostly written in a rather technical language that uses many specialist terms, making it hard to understand for non-economists. This even holds for the Summary section at the beginning of the Report, which is rife with economic terminology and acronyms (such as CPI, CPIEFE, GDP, GFCF and PPP) that are not immediately clarified and sometimes not even included in the Glossary or Abbreviations sections at the end of the Report.

Although there is a trade-off between accessibility and precision, the BCCh could achieve a better balance in its Monetary Policy Report by including a box with the key features of its monetary policy

[30]/ For instance, two of the three alternative scenarios in the June 2019 Monetary Policy Report were only analyzed in qualitative terms.

framework, making the Summary more accessible to a wider audience and using the subsequent chapters to go into the finer details of the analysis. The Summary could be made more accessible by focusing on the issues that are most important, using simpler, shorter sentences, and always fully writing out an acronym when it is first used. Furthermore, accessibility is improved by presuming less background knowledge. Ideally, it should be written in such a way that it is understandable to non-economists from Chile to facilitate public accountability of the BCCh, and to economists from outside Chile to enable them to make well-informed investment decisions by providing macroeconomic transparency. Moreover, the Monetary Policy Report plays an important role in the formal accountability of the BCCh. Hence, its Summary should be fully understandable to Senators, regardless of their educational background, so that they can make a well-informed assessment.

For some of the Reports, the Summary is quite inaccessible. For example, in the March 2019 Monetary Policy Report it starts with presuming an intimate familiarity with recent macroeconomic developments in Chile, the baseline scenario projections from the previous Report, and the latest changes in the calculation of the CPI, using quite technical language.[31]

The Summary of the June 2019 Report is noticeably easier to read, although it still poses significant challenges for non-specialists, especially to understand the tables and fan charts.[32] The latter could be simplified by just showing the 10%, 50% and 90% confidence bands and explaining that they are based on historical forecast errors for the BCCh's forecast models, making them much more accessible.

Nevertheless, for expert readers the tables and numerous graphs in the Monetary Policy Report provide a wealth of information. The presentation of information in tables and graphs is usually of a high quality and well documented, although it is sometimes a bit sloppy, as just noted. For instance, it is not always clear how a variable, such as the exchange rate, is defined or should be interpreted. And the English translation (also in the MPM statements and minutes) commonly has glitches and odd usage of some terms, such as 'impulse', which could cause confusion or misinterpretation. Appendix 6(b) further discusses issues with the write-up and presentation, which are all straightforward to address.

In short, *the Panel recommends improving the Monetary Policy Report, and especially its Summary, to make it more accessible, including a box describing the Bank's monetary policy framework, an informative digest at the start of each chapter and a complete glossary at the end of the Report*.

4.2.3 Monetary Policy Meeting Minutes

The BCCh started regularly publishing minutes (*minuta*) of its MPMs, including the individual voting records, in February 2000. An English translation of it has been provided since 2012. The minutes are released 11 bank working days after the meeting.

[31]/ For example, in the second paragraph, *"reducing the y-o-y index variation with respect to the December estimate (Box IV.1). Thus, while when using the 2013 = 100 base […]"* (p. 7).

[32]/ Although the second table notes that the variables indicated by an asterisk are defined in the glossary, the latter does not mention all of them, including the "GDP at PPP" measures. The footnotes of the fan charts refer to *"the RMSE of averaged MAS-MEP models"*, with none of the acronyms even mentioned in the Abbreviations section.

Significant changes were made to the structure and contents of the minutes starting in January 2018, in some respects making them less informative. The main text of the minutes used to be around five pages long in landscape orientation with two columns and a relatively small font, so it effectively amounts to around 10 more regularly formatted pages. The minutes featured three sections:

- "*Background and options*" summarized a presentation by the Research Division on international and domestic macroeconomic and financial developments since the previous meeting and the monetary policy option(s) proposed by the Research Division, including any forward policy guidance (often in the form of a 'policy bias').

- "*Monetary policy decision*" provided a summary of the Board's discussion and analysis of external and domestic developments, followed by Board Members' views on the monetary policy decision, usually with one paragraph (up to an entire column long) allocated to each Board Member (generally unattributed).

- "*Agreed policy action*" was very short, merely stating the monetary policy decision and how each Board Member voted.

In addition, the BCCh used to publish 'background minutes' (*antecedentes*) one day before the MPM, which summarized public economic data, and release an extensive set of charts and tables one day after the MPM, which showed macroeconomic and financial data that were presented to the Board, all in Spanish only.

Since January 2018, the minutes have featured a separate section on the Board's analysis of the monetary policy options. The structure of the minutes is currently as follows:

- "*Analysis of the technical teams*" covering both the international and domestic 'scenario'.[33] This section is only included when the MPM is without MPR.

- "*Background analysis and discussion*" summarizes the debate (mostly between BCCh staff and the Board) on the analysis of current macroeconomic and financial developments.

- "*Analysis of monetary policy options*" summarizes the discussion (mainly among the Board Members) of the monetary policy option(s) considered relevant at this meeting, including any forward guidance (or 'bias').

- "Monetary policy decision" used to merely state the monetary policy decision and how each Board member voted. Since March 2019 it usefully provides some concluding explanation or considerations about the decision. In case a Board Member dissents, there is a full (attributed) paragraph with an explanation for the dissent.[34]

- Background charts and tables showing international and domestic macroeconomic and financial developments. These are only included when the MPM is without Monetary Policy Report, and only in the Spanish version of the minutes.

[33]/ The use of the word 'scenario' is peculiar in this context because it does not refer to any baseline or alternative scenario used for projections, but to a description of current (macroeconomic and financial) conditions and developments.

[34]/ So far, this has only happened once (in July 2019) under the new regime since 2018.

The main text of the minutes (excluding charts and tables) is still around five (effectively ten) pages for MPMs without Monetary Policy Report, but only around two (effectively four) pages for MPMs with Monetary Policy Report. For the latter, the minutes no longer include an account of relevant international and domestic macroeconomic and financial developments. In that sense, the minutes are no longer self-contained for meetings when the Monetary Policy Report is available. In addition, the extensive set of background charts and tables in Spanish is now only released for MPMs without Monetary Policy Report and with a longer delay than before.

The BCCh's MPM minutes tend to reveal the reasoning of Board Members in quite some detail. They provide invaluable insights into their perspectives and considerations. They clearly show differences in opinion among Board Members. In these respects, the MPM minutes appear more transparent and less 'sanitized' than those of some other inflation-targeting central banks, including the Bank of England.

Before 2018, the minutes contained a full paragraph for each Board Member explaining their views on the monetary policy decision, which made it possible to understand the (often nuanced) reasoning of each. But this final 'go-around' at the MPM occurred in a strict (increasing) order of seniority of the Board Members, so analysts who had worked at the BCCh or were otherwise aware of this inside information could easily identify them. Following the recommendation of the Claussen (2017) review, the write-up of this part of the minutes has changed to fully anonymize it. But instead of preserving these paragraphs and randomizing their order, valuable information has been lost by re-writing this part to resemble a discussion format, which highlights views that are common among Board Members, supplemented by other key considerations mentioned by some Board Member(s). But the actual proceedings of this final part of the meeting have not changed and still consists of each Board Member explaining their monetary policy decision in turn (largely read from a prepared statement). So, the minutes have become less transparent in this respect and generally no longer provide precious insights into the reasoning of each Board Member (except in case of a dissenting vote).

Although dissenting votes are not common at the BCCh's monetary policy meetings, the minutes nevertheless reveal that Board Members can differ significantly in their views, including about the appropriate policy rate. For instance, the minutes of the 19 January 2017 MPM state that one Board Member was seriously contemplating a 50 basis point rate cut, whereas another did not countenance that option but was finely balanced between keeping the monetary policy rate at 3.5% or reducing it by 25 basis points. Nevertheless, the Board unanimously decided on the latter.

Furthermore, the minutes show that communications play a vital role in the BCCh's monetary policymaking. Most notably, the latter is reflected in the fact that the Board nowadays regularly provides forward policy guidance in its MPM statement. It is clearly considered an explicit part of the monetary policy options and the decision. In addition, in its analysis of policy options the Board routinely discusses their communicational aspects or risks, which sometimes appear to be a decisive factor.[35]

The minutes also disclose other valuable information about Board Members' views. They show that market expectations are often an important consideration.[36] And it is not unusual for the minutes to express concern about how a specific decision could be (mis)interpreted by markets.

[35]/ For instance, see the MPM minutes for 7 June 2019 and 17-18 July 2019.

[36]/ For instance, a Board Member referred to *"the Board's conviction that guiding and preparing the market was usually preferable to surprising or confusing it."* (Minutes of 19 January 2017 MPM, p. 5).

Moreover, the minutes reveal how some communication practices can be detrimental. The customary brevity of MPM statements before 2018 posed challenges, because it did not provide space to explain significant changes compared to the most recent Monetary Policy Report. The minutes show that this left the Board constrained in its options and made it more inclined to follow along the Monetary Policy Report baseline scenario because it required the least explanation.[37]

The baseline scenario of the most recent Monetary Policy Report is frequently mentioned in the minutes and appears to serve as a key reference point in the deliberations. In line with a confirmation bias, the minutes suggest that there is an inclination to conclude that the baseline scenario basically remains valid, despite significant new developments suggesting otherwise (see Section 2.2).

Uncertainty is prevalent in monetary policymaking and the minutes indicate that Board Members commonly prefer to wait for more information and follow the baseline scenario until considering (more decisive) action at the next Monetary Policy Report.

The minutes also indicate that the BCCh's monetary policy focuses on achieving price stability through its 3% inflation target and that financial stability considerations currently only occasionally play a minor role in its monetary policy decisions.[38]

Overall, the minutes suggest that the BCCh's monetary policy decisions are based on careful deliberation and that the discussion is usually of high quality. Occasionally, the minutes in English contain a statement that raises eyebrows, but that is typically due to an awkward translation (such as using the word 'impulse' instead of 'stimulus').

Lastly, in 2018 the BCCh started publishing the monetary policy meeting 'transcripts' ('*acta*') with a 10-year lag (coinciding with the 10-year tenure of Board Members), retroactively since 2000 (when the previous MPM scheme was implemented). It is only available in Spanish and generally not an exact, verbatim transcript (although it occasionally had full paragraphs in quotes), but it appears to provide an extremely detailed, attributed account of what was said at the meeting.

This provides a wealth of information for economic historians. The 10-year lag means that Board Members' discussions at the MPM remain private for the duration of their tenure, so that publication of the transcripts is less likely to distort the discussion at the meeting.

4.2.4 Presentations by Board Members

To fulfill its legal disclosure requirements, the Board submits the September Monetary Policy Report to the Minister of Finance and the Senate. In addition to this testimony, which is before the Senate in plenary session, the Board also submits the other Monetary Policy Reports to the Senate, to keep it informed as required.

[37]/ For instance, see the 14 February 2017 MPM minutes.

[38]/ For instance, at the 19 January 2017 MPM, one Board Member concerned about the debt levels of some agents considered it an important risk of a 50 basis points rate cut that it would lead to increased borrowing in the short term.

Thus, each Monetary Policy Report is presented to the Senate, either in plenary session (in September) or to the Senate Finance Committee (*Comisión de Hacienda del Senado*), by the Governor, who is joined by the other Board members. The testimony is broadcast live on the Senate TV channel and website (*TV Senado*, tv.senado.cl). The slides of the Governor's presentation and the text of his statement, but not the subsequent question and answer session, are posted on the BCCh website, and with some delay, also released in English.

A few hours after the Senate testimony, the Governor holds a press conference, joined by the Head of the MPD. At this press conference (in Spanish), which is webcast, the Governor gives a short presentation of the Report, using simpler, more accessible slides, which is followed by a question and answer session, but generally these are not posted on the BCCh website.

In the subsequent days, Board Members present the Report throughout the country. For instance, the June 2019 Monetary Policy Report was presented by the Governor and three other Board Members in five different cities spanning the whole length of Chile, which constitutes an impressive regional outreach by the BCCh. Two of these were part of the seminar series "*Encuentro Banco Central de Chile con Regiones*" (BCCh meeting with regions), through which the BCCh holds regional meetings that are organized together with a local university.

These subsequent presentations of the Monetary Policy Report are based on a similar set of slides, which are posted on the BCCh website with some additional text added at the top of slides. But the actual presentation can differ substantially from the limited text in these annotations and provide significantly more detailed explanations. Thus, the slides on the website are not a good substitute for the actual presentation, but unfortunately the BCCh usually does not provide a transcript, webcast or other recording of the latter.[39] This could easily be remedied using modern lecture capture technology, which only requires some software on the laptop used for the presentation to record the sound together with the slides. This could conveniently make all Board Members' presentations available to the public.

There is some variation in the set of slides used for these presentations of the Monetary Policy Report. The press conference presentation is generally shorter and features simpler, more accessible graphics than the Senate presentation. The presentations throughout the country often have some slides on economic developments in the region at the end, but each Board Member usually makes some other modifications to their presentation slides, including changes in the text. Although the presentation is mostly in line with what is stated in the MPR, minor re-phrasings could subtly change the meaning and make a significant difference in the case of forward guidance. For instance, in the Governor's presentation of the Monetary Policy Report on 13 June 2019, a different phrasing was used for the forward guidance on the timing of normalization of the monetary policy rate than in the Monetary Policy Report (or MPM statement). The Monetary Policy Report refers to *"inflation being in a clear process of convergence to the target"* (p. 9), but the overview slide of main points in the presentation states that the Board will not contemplate resuming normalization until evidence of *"a sustainable rebound of inflation"*.[40] Although this could be interpreted as a clarification, the latter condition appears more demanding (in terms of timing and requiring a rise in core rather

[39]/ In 2018, 12 out of 28 MPR presentations were webcast, and only 6 out of 17 so far in 2019.

[40]/ More precisely, in the Spanish version of the June 2019 Monetary Policy Report (p. 9): *"Hacia adelante, el inicio de la normalización de la TPM dependerá de que la inflación se encuentre en un claro proceso de convergencia a la meta."* But in the Governor's presentation of 13 June 2019 (slide 2): *"Hacia adelante, el Consejo no contempla retomar la normalización de la política monetaria hasta contar con evidencia de un repunte sostenible de la inflación."*

than just headline inflation). Since any rephrasing of forward guidance could unwittingly alter its meaning, Board Members should take great care when using a different phrasing than in the Monetary Policy Report or MPM statement.

Pertinent information is provided at times during the questions and answers (Q&A) part of the Monetary Policy Report press conference,[41] which is only available as a webcast in Spanish. The BCCh should improve the accessibility of such key communications by Board members. The Governor's presentation at the press conference and a transcript of the Q&A session should be released (also in English) because they can provide important insights. Currently, only the presentation of the Monetary Policy Report before the Senate (without the Q&A session) is provided in English, with a delay of around a month.

The slides for the Monetary Policy Report presentations contain many charts and some tables, but it is notable that they tend to focus on economic activity, rather than inflation. Furthermore, they do not tend to convey the uncertainty underlying projections, except for annual GDP growth projections, which are always shown as a range (of usually 1 percentage point). Graphs of projections tend to show the change in the baseline projection compared to the previous Monetary Policy Report, but otherwise do not convey the underlying uncertainty. The discussion of the latter is often confined to a slide on the balance of risks. Interestingly, in a graph of estimated past and projected future output gaps, the range of estimates is shown for the past output gap, but for the projected future output gap there is just a single line (and a comparison to a previous Report), giving little indication of its (much greater) uncertainty.

An effective way to illustrate the uncertainty underlying a projection is to show it in a 'fan chart' that includes confidence bands, which is a practice adopted by many central banks, including the BCCh. But the fan charts for the inflation projections shown in the Monetary Policy Report Summary are not included in the Monetary Policy Report presentations. Perhaps, Board Members find them too complicated to explain, especially to a wider audience. Currently, the BCCh's fan charts for inflation and GDP growth show confidence intervals of 10%, 30%, 50%, 70% and 90% around the baseline scenario, and the footnotes to these charts are extremely technical. But they could easily be simplified by only showing the 10%, 50% and 90% confidence intervals, which makes them much easier to explain to a wider audience. The darkest band has only a one in ten chance of occurring, the next one a one in two chance, and the widest one is most likely, but still features a one in ten chance of outcomes outside it.

In addition, Board Members should be encouraged to go into a more explicit discussion of risks and their implications in their presentations. A good example is the Monetary Policy Report presentation by Board Member Alberto Naudon on 13 June 2019, which stressed the negative risks to economic activity and thereby inflation (on the concluding slide).[42] Although the Bank's estimates indicated that the 50 basis point increase in monetary stimulus should be sufficient to achieve convergence of inflation, he emphasized that this is conditional on the baseline scenario happening, but that there are many risks on the downside.[43]

[41]/ For instance, at the press conference of 5 December 2018 the Governor provided a numeric clarification in response to a question about 'gradual' in the MPM statement's forward guidance.

[42]/ It also tried to dispel the possible misconceptions that the 50 basis point cut in the policy rate reflects a pessimistic vision of the Chilean economy, or a promise not to further move the policy rate.

[43]/ His remarks turned out to be prescient; at the MPM in July 2019 the Board provided conditional forward guidance of further monetary stimulus.

This presentation differed significantly from those by other Board Members, but such diversity should be welcomed, provided the main points of the Monetary Policy Report and the Board's stance are accurately conveyed. It is useful for Board Members to add their interpretations and concerns in their presentations, especially since the MPM minutes have become a lot less informative about each Board Member's reasoning. For example, a Board Member could supplement the Board's forward guidance by explaining what issues or variables he/she will be paying special attention to (e.g. to determine whether inflation is in a "clear process of convergence to the target" or experiencing a "sustainable rebound"). It is natural for Board Members to have different views on this. As long as such views are clearly expressed as their own and supplementing the Board's stance and made widely available, this helps to better understand monetary policymaking. Of course, it is important to try to prevent a 'cacophony', but the opposite is equally undesirable.

Encouraging expressions of dissent helps to prevent groupthink within the Board. The strength of decision-making by committee is that it facilitates incorporating a diversity of views and therefore leads to better decisions. In addition, when the Board tends to speak with one voice (including forward guidance), the private sector will be tempted to blindly follow it, which limits the flexibility of the BCCh to quickly make adjustments when needed. But when the private sector gets more exposure to a diversity of views (when significant differences among Board members exist), then it will be forced to assess the merits of these different views and adjust its monetary policy expectations in response to incoming data.

Thus, it would be desirable for the Board to better communicate significant differences in views among its Members, also in public appearances of Board Members, because it reflects a healthy diversity of opinion and is likely to make the private sector less reliant on the Board's (consensus) forward guidance, thereby providing greater flexibility to move quickly when needed without upsetting markets.

Usually, BCCh Board Members give a total of around 70 to 80 speeches and presentations per year, most of them by the Governor (e.g. around 60% in 2018). Many are for the Monetary Policy Report (around 40% in 2018). Other presentations are often about current economic developments. The text of speeches and the slides of presentations are generally posted on the BCCh website (except for press conferences), but the actual presentation is usually not publicly available. Only around a quarter of Board Members' speeches and presentations was webcast in 2018 (and also so far in 2019), most of them for the Monetary Policy Report.

Finally, Board Members observe a purdah of seven days before MPMs and ten days before Monetary Policy Report releases, during which they refrain from any public communications regarding the economy.

Overall, the Panel recommends that the Board improves the communication of uncertainty in its presentations (for instance by showing projections in simplified fan charts). In addition, it would be desirable to improve the public availability of these presentations (including question and answer sessions).

4.2.5 Other Communications

The BCCh publishes an *Annual Report*, but it was hardly used for monetary policy communications. In fact, the section on monetary policy used to be only a few paragraphs long (excluding an appendix that reproduces all the MPM press releases). The *Annual Report* for 2018, however, has

been significantly expanded (from around 150 pages to more than 200) and has been given a new structure that better reflects its mandate. It now includes a separate chapter dedicated to monetary policy (eight pages long), that provides a summary of the monetary policy framework, general economic climate, monetary policy, monetary management, debt management and regional presentations of the Monetary Policy Report.[44] The *Annual Report* is now significantly more informative about monetary policy, but there is still little evaluation of the BCCh's achievement of its price stability objective. It is not even mentioned that CPI inflation fell outside the 2-4% range for a few months during 2018. There is no explicit, proper annual evaluation in the Monetary Policy Report either. A Box in the March Monetary Policy Report would be useful, or a separate annual *Account of Monetary Policy,* as published by the Swedish Riksbank.

The BCCh published an official document (BCCh, 2007) that provides a detailed description (of around 40 pages) of its monetary policy framework, which features central bank independence, full-fledged inflation targeting and a floating exchange rate regime. It describes the legal and institutional framework and presents the BCCh's monetary policy objectives, strategy, decision-making process, communications and implementation. Such a document is very useful to provide transparency about the monetary policymaking framework and process.

According to this document, the BCCh's inflation-targeting framework features a *target range* for annual CPI inflation of 3% plus or minus one percentage point, with "*the midpoint of the target range as the economy's nominal anchor.*" (BCCh, 2007, p. 6).[45] Nowadays, the BCCh tends to communicate its inflation goal as a target of 3% with a (tolerance) range of plus or minus one percentage point. In practice, the BCCh appears to conduct monetary policy with a point target of 3%, although the (tolerance) range is still referred to in its official communications (such as the Monetary Policy Report and monetary policy meeting minutes). But the role of this range is not clearly communicated. It could be used for accountability purposes to provide (additional) explanation of why inflation has moved so much from its 3% target and how the Board is responding to this.[46] For instance, a Box could be included in the Monetary Policy Report if CPI inflation is outside the (tolerance) range to enhance public accountability.

There have been other significant changes during the last decade, including to the BCCh's monetary policy communication practices, so *the Panel recommends that the BCCh's official document describing its monetary policy framework (BCCh, 2007) should be urgently updated*. This was also recommended by the Claussen (2017) review but has not yet been implemented.

The BCCh also provided an extensive (90 page) official document (BCCh, 2003) describing the macroeconomic models used for its projections, including its structural projection model MEP (*Modelo Estructural de Proyección*), auxiliary models and indicators, and the MACRO model tool (which ensures consistency of projections for different sectors based on national accounts identities). It provides transparency by specifying all the equations, usually including estimated coefficient

[44]/ There is also a (much longer) chapter on "Communication and Transparency" (of 17 pages), which describes the BCCh's considerable communications and outreach efforts.

[45]/ The Glossary defines "target range" as "width of the inflation target", which for the BCCh "covers an interval of 2% to 4%" (BCCh, 2007, p. 36). Figure 1 of BCCh (2007, p. 16) also clearly shows an inflation target range (instead of a point target) since 2001.

[46]/ The Bank of England Monetary Policy Committee (MPC) is required to write a public letter when inflation deviates more than one percentage point from its 2% target, to explain why inflation has moved so much from the target, what policy action the MPC is taking in response and when inflation is expected to return to its target.

values. Furthermore, it illustrates how output and inflation respond to a temporary change in the monetary policy rate according to MEP, which shows the effects peaking at around four and eight quarters, respectively. In addition, it shows the sacrifice ratio, exchange rate pass-through and the effects of external shocks in MEP, providing a useful account of the model's properties. It also sketches the iterative process between Board Members and BCCh staff through which judgment is incorporated into the projections (BCCh, 2003, Box 1), although no information is provided on its (quantitative) importance or its value added in improving the projections.

Moreover, the BCCh's modeling and policy analysis framework has significantly changed over time. Its DSGE model XMAS (discussed in Section 2.3) has recently been published (García et al., 2019), but MEP has also been updated, and it is not clear how the BCCh's projections are constructed using the different models, including a range of satellite models. So, the BCCh should provide greater transparency about its modeling and policy analysis framework and the construction of its macroeconomic projections in the Monetary Policy Report by updating its modeling framework and projection document (BCCh, 2003). There are individual documents describing updates to some of the models, but what is needed is a single document that explains the various models and how they are used for the conduct of monetary policy in a clear and articulate manner.

The BCCh's *Economic Policy Papers* series provides insights into the thinking of BCCh authorities on issues relevant to the conduct of monetary policy and the economy. Research papers by BCCh staff economists are disseminated through its *Working Papers* series. Some of the papers in these series are in Spanish, in which case a brief abstract in English is provided. It would be helpful to also include a more extended non-technical summary in English and Spanish, especially for the *Economic Policy Papers*, to improve accessibility. The BCCh also publishes the journal *Economía Chilena* three times per year (mostly in Spanish), focusing on empirical issues that affect the Chilean economy and are relevant for the conduct of economic policy.

Recently, the BCCh has started publishing an annual flagship research report (in Spanish) on a specific topic, based on research by its economists.[47] It would be desirable to release the flagship research report's extended summary in English as soon as it is published, especially when the topic is relevant to monetary policymaking, to allow for a wider dissemination of the report's findings.

The best-known research publication of the BCCh is the proceedings of its Annual Conference (which this year was on *"Independence, Credibility, and Communication of Central Banking"*). The conference volume is published in the BCCh's Series on *Central Banking, Analysis and Economic Policies* and freely available on its website.

BCCh announcements and publications are all released on its official website (www.bcentral.cl/en/web/central-bank-of-chile), which is available in Spanish and English, although the latter provides much less information. The home page gives direct access to the BCCh's latest announcements and releases, including the Monetary Policy Report and the Financial Stability Report. The website has a separate section on *Monetary Policy,* that provides links to the MPM press releases and minutes, and in the Spanish version also MPM transcripts and useful Monetary Policy Report material, including supplementary documents and (since 2018) Excel files with the tables and figures. However, it has no links to the Governor's presentations (statements or webcasts) of the Monetary Policy Report. In

[47]/ Last year it focused on the labor market, establishing stylized facts and considering its macroeconomic implications, and the previous year it analyzed trend growth (BCCh, 2017, and 2018). The English translation of the former was released after more than a year.

addition, the *Monetary Policy* section does not provide a description of the BCCh's monetary policy framework, or even mention its inflation target. See Appendix 7 for more detailed comments.

In addition, the BCCh website has an elaborate *Statistics* section, which reflects its legal duty (by Section 53 of the LOC) to compile and publish the main macroeconomic statistics in a timely fashion. The BCCh provides an unusually rich set of macroeconomic and financial statistics, which is very useful for monetary and financial policymaking. Notable are the widely used CPI-indexed unit of account UF and the monthly indicator of economic activity, IMACEC (*Indicador Mensual de Actividad Económica*). In addition, the BCCh regularly conducts surveys to measure expectations of macroeconomic variables, including the monthly EES, and since late 2009 also the FTS, which is conducted before and after each MPM. It also publishes the quarterly *Business Perceptions Report* (BPR). Further, more detailed comments about BCCh statistics are provided in Appendix 8, including the BCCh's extensive online *Statistics Database (Base de Datos Estadísticos*, BDE) and its handy mobile app (*BDE Móvil*).

Finding information on the BCCh website, however, can be challenging. Using the main search box generally yields a list that appears to be in a random order.[48] Furthermore, the feature to filter search results by time (e.g. past year or a custom range) usually does not work.[49] Also, it does not appear to be possible to search BCCh Working Papers by author or select them by year. And occasionally, important information is completely mislabeled.[50]

The Panel recommends that the BCCh significantly improves its website by making it more informative and user-friendly, including a page with an up-to-date description of its monetary policy framework, adding links on the Monetary Policy Report web pages to the statements and webcasts of the Governor's presentation before the Senate and at the press conference, and fixing the problems with the website search facilities.

Journalists tend to play an important role in communicating monetary and financial policy to the wider public, including through television and newspapers. During the last decade the BCCh has organized an annual training seminar for them consisting of a series of workshops to enhance their knowledge of economic issues related to the BCCh's work. By making journalists more knowledgeable, the BCCh contributes to disseminating its policies more effectively.

The BCCh is also quite active on social media. Its official Twitter account (*@bcentralchile*), which is in Spanish, has 25k followers. The BCCh tweets its monetary policy decisions, including the accompanying statement from the Board, and its quarterly Monetary Policy Reports, including a table with projections for economic activity. The presentations of the Report before the Senate, at the press conference, and elsewhere, are well advertised and covered, usually including some photos and a few presentation slides. In addition, the BCCh tweets the release of statistics and surveys, often highlighting some data (e.g. average mortgage rates) or posting the entire results (e.g. for the EES, FTS and business cycle indicators). It also uses Twitter to publicize its public outreach activities.

[48]/ For instance, the list that appears after searching for "Annual Report" or "minutes" is not in any logical (chronological or alphabetical) order.

[49]/ For instance, searching for "inflation target" and filtering by date to "Past Year" (or any custom range) still yields results from the last two decades.

[50]/ On the Board web page, the *"Internal Rules of Procedures of the Board of the Central Bank of Chile"* are mislabeled as *"Minutes Monetary Policy Meeting held on January 2017"*.

The contents posted in BCCh tweets is usually not customized to this form of media, except for the monetary policy decision and some highlighted data from statistics releases. The BCCh would benefit from making better use of social media as it provides a great way to reach a wider audience and educate the public about its key objectives and decisions. The BCCh's monetary policy announcement tweet could easily be improved. For instance, on 7 June 2019 the BCCh simply tweeted that the Board had decided to reduce the monetary policy rate by 50 basis points to 2.5%, but this could have been concisely prefaced by stating its key purpose, to maintain price stability, or more specifically, to achieve its 3% inflation target. This could have been followed by a few tweets to provide an accessible, snappy explanation in a nutshell. The BCCh should aim to make its monetary policy communications on social media more accessible to the Chilean people to facilitate public accountability.

Interestingly, the BCCh is much better at customizing its messages to a wider audience with respect to financial stability. For instance, the publication of its Financial Stability Report on 15 May 2019 was accompanied by eight, easy to understand tweets with attractive illustrations that managed to get across the main points of the Report. The BCCh would benefit from using a similar approach for its monetary policy social media messaging.

The BCCh has its own YouTube channel, which has webcasts of the Senate testimony and press conference for the Monetary Policy Report. It also has presentations of its Annual Conference as well as material related to its public outreach activities.

Regarding the latter, the BCCh organizes an annual competition for high school students, called *"Economía + Cerca"* (Economics Up Close), in which groups of students (supported by their teachers) prepare a video of at most three minutes on a specific topic related to the BCCh's functions. For instance, in 2018 the topic was how the autonomy of the BCCh contributes to keeping inflation low and stable; and for 2019, its 15th competition, the topic is the impact of the (global 2008 or domestic 1982) financial crisis on Chile. This is a great way to engage high school students.

In addition, the BCCh developed an animated video series, *EconoAmigos*, which is centered on a group of children and provides an entertaining platform for learning about the BCCh's functions, the monetary policy rate, the meaning of inflation, the concept of money and the implications of debt. The BCCh also provides educational tours at the Bank for high school and university students, with close to 4,000 participating in 2018. Furthermore, every year the BCCh literally opens its doors for a weekend to welcome the general public to celebrate National Heritage Day. This year around 2,500 people visited the Bank during this weekend at the end of May and they received tours of the building and presentations by BCCh staff, including the Governor and General Manager. The BCCh clearly succeeds in reaching out to many!

4.3. Macroeconomic Projections

The publication of macroeconomic projections, especially medium-term inflation forecasts, is a key feature of inflation targeting, the monetary policy strategy that the BCCh has used since 2000. The reason is that monetary policy affects economic activity and inflation with a substantial lag of around one and two years, respectively. So, an inflation-targeting central bank sets the monetary policy rate such that its forecast for inflation in around two years is equal to its inflation target. Hence, the monetary policy strategy of inflation targeting is sometimes referred to as inflation-forecast

targeting. Central banks that have adopted inflation targeting, however, tend to publish other macroeconomic projections as well, especially for GDP growth. In fact, the practice of publishing central bank forecasts has become widespread and is not confined to inflation targeters.[51]

The publication of the central bank's macroeconomic forecasts is useful for two reasons.[52] By providing information about the macroeconomic outlook, the central bank allows the private sector to make better informed economic decisions. This is particularly beneficial to the many households and (small) firms that would otherwise be deprived of information about macroeconomic prospects, especially in an emerging market like Chile, which frequently faces sizeable external shocks. For this purpose, unconditional forecasts that describe the most likely outcome are most useful, and the benefits are greater when the forecasts are more accurate.

Furthermore, the publication of the central bank's macroeconomic forecasts allows the private sector to evaluate whether monetary policy decisions are consistent with achieving the central bank's objectives. The reason is that the monetary policy rate reflects both the central bank's intentions and the macroeconomic shocks that it anticipates, and the latter are also incorporated into the central bank's macroeconomic projections. To identify the central bank's policy intentions, its projections for both inflation and output are needed, as well as any assumptions on which they are based, such as the path for the monetary policy rate, fiscal policy and commodity prices (e.g. for oil and copper).

For instance, suppose a central bank has cut its monetary policy rate. This could be in response to an anticipated recession (e.g. due to a negative aggregate demand shock), or it could be an attempt to stimulate output to an unsustainably high level (e.g. due to political pressures). These two cases can be distinguished when the central bank's macroeconomic projections are published. Other reasons for a decrease in the monetary policy rate could be a reduction in the central bank's estimate of the neutral policy rate, or an increase in its estimate of potential output and thereby a decline in its output gap estimate, both of which applied to the 50 basis point 'recalibration' rate cut by the BCCh in June 2019, as explained in the MPM statement and MPR. By providing these estimates, its macroeconomic forecasts and underlying assumptions, the BCCh allows the private sector to infer its policy intentions from its policy actions and to verify they are consistent with its inflation target, thereby facilitating public accountability of its monetary policy decisions.

In short, to evaluate the central bank's monetary policymaking it is vital that the central bank publishes its medium-term projections for both inflation and output, and that it makes clear the assumptions on which they are based, especially regarding the path of the monetary policy rate. In addition, it is important to know the central bank's estimates of potential output and the neutral level of the monetary policy rate. The evaluation is further facilitated if the central bank publishes the macroeconomic model(s) it uses for its forecasting and monetary policy analysis. Note that the publication of the central bank's projections is even useful when they are inaccurate, because they still help to explain the central bank's policy actions. But an additional advantage of releasing the projections is that it gives the central bank an incentive to improve their quality, which further benefits its monetary policymaking and enhances the credibility of its inflation target.

[51]/ Dincer, Eichengreen and Geraats (2019) report that in 2015, 66 out of the 112 central banks in their sample released at least some of their numeric macroeconomic forecasts, with 31 publishing their medium-term forecasts for both inflation and output at quarterly frequency, compared to only 9 and 4, respectively in 1998.

[52]/ See Geraats (2014) for a more detailed discussion of the effects of such macroeconomic transparency.

As discussed in Section 4.2.2, the BCCh now publishes its inflation and output growth projections for a three-year horizon in its quarterly Monetary Policy Report, but it is not always transparent about the key assumptions that they are based on. Some are clearly stated for the three-year projection horizon (e.g. in the table *International Baseline Scenario Assumptions* in the Summary), but other variables are often more vaguely sketched, including the real exchange rate, fiscal policy and the monetary policy rate, which are all important inputs to the projections.

For instance, in the June 2019 Monetary Policy Report, it is assumed for the real exchange rate *"that during the next two years it will fluctuate around its 15- and 20-year averages."* (p. 10) The magnitude of the latter is only revealed later in the Report (on p. 20), but no information is provided about what is assumed for the third year of the projection horizon or about the magnitude of the fluctuations. The latter can be large (as shown in Figure II.5 of the Report), and the size of short-term fluctuations in the (real and nominal) exchange rate has significant implications for inflation.

Regarding fiscal policy, the June 2019 Monetary Policy Report states that *"it is foreseen that in 2019 the impulse that the economy will receive will be consistent with the approved budget. From then onwards, it is assumed that the structural deficit will follow the path of gradual descent defined by the authority."* (p. 10) But no further details are provided about the sign of the fiscal "impulse", the magnitude of the "approved budget" or the path of the structural deficit. So, it is not clear from the Report to what extent fiscal policy is assumed to be expansionary or contractionary over the three-year projection horizon.

Finally, with respect to the monetary policy rate, it is assumed in the June 2019 Monetary Policy Report that *"during the coming quarters [it] will remain where it is, to begin a gradual normalization process during next year."* (p. 10) This leaves one wondering exactly how long the monetary policy rate is assumed to remain constant at 2.5%—for two, three or perhaps four quarters? In addition, although the Report revealed the Board's new estimate of the neutral monetary policy rate to be between 3.75% and 4.25%, it is not clear when this range or its midpoint is assumed to be reached, and therefore what the "gradual normalization process" is presumed to look like.

In other Monetary Policy Reports, the BCCh has often described the policy rate path assumed for its projections as "similar" to survey expectations or to market expectations implied by financial assets prices, without making clear how the assumed path differs from them, or which of the two (EES or FTS) survey expectations it is closer to. The assumed policy rate path has also been described as "somewhat higher" than in the surveys (e.g. in the March 2015 Monetary Policy Report), without specifying by how much and for what part of the policy horizon. Sometimes the description is incomplete in another respect. For instance, in the June 2015 Monetary Policy Report the policy rate path was assumed to *"be similar to what is suggested by surveys over a one-year horizon"* (p. 9), without providing any information about how they compared or differed for the remainder of the projection horizon.

In short, the assumptions for these key variables are often quite vaguely described, which makes it hard to interpret the resulting projections and use them to assess the BCCh's policy actions. *As a result, the Panel recommends that the Monetary Policy Report should provide more transparency about the working assumptions used for the medium-term macroeconomic projections in the baseline scenario.*

Another issue is what assumptions to make for the macroeconomic projections, including with respect to the monetary policy rate. There are several options that central banks have used for the latter, including assuming a constant policy rate (used by the BCCh from 2000 until mid-2004), market expectations (e.g. Bank of England), a monetary policy reaction similar to a Taylor rule (currently used by the BCCh), or the central bank's own projected policy rate path (e.g. Swedish Riksbank).

In principle, each could be communicated transparently, although a path based on a monetary policy rule could easily be mistaken for the central bank's own projected policy path. In addition, assuming a policy path that significantly deviates from market expectations is problematic as current asset prices and other macroeconomic outcomes are inconsistent with the presumed policy path. These issues are discussed in greater detail in Appendix 9, which also shows that during the last decade, the policy rate path for the BCCh's projections has exhibited a substantially larger upward bias than private sector survey expectations at a horizon of one to two years (see Table 1), which may make the latter a more appropriate conditioning assumption. But if the central bank would like to provide greater transparency by publishing its projection for the policy rate, then it is natural to base its other macroeconomic projections on its projected policy rate path. Its publication provides a comprehensive form of time-dependent forward policy guidance, which is discussed in greater detail in the next Section.

4.4. Forward Policy Guidance

In general, forward policy guidance provides an indication of the likely direction, timing or pace of upcoming monetary policy moves.[53] This is important to provide transparency about the monetary policy stance. One reason is that the policy instrument is generally adjusted in discrete steps (such as 25 basis points for the monetary policy rate), so the policy decision is an imprecise description of the monetary policy stance (rounded to the nearest 25 basis point step). As a result, the statement of the monetary policy stance is generally incomplete without providing a policy inclination.[54]

Furthermore, the main monetary policy instrument is usually a very short-term interest rate, such as the BCCh's monetary policy rate, whose current level has little impact on its own, but expectations of its future levels are an important determinant of longer-term interest rates that matter for private sector saving and investment decisions.[55] So, economic activity and inflation depend not only on the size of a change in the current level of the policy rate, but also on how long the central bank is expected to maintain this change, and how it is expected to adjust the policy rate in the future. Thus, the current policy rate is insufficient to provide full transparency about the central bank's monetary policy stance and disclosure of the central bank's projected policy path is needed as well. In short, the projected policy path is an integral part of the monetary policy stance.

[53]/ See Geraats (2014) for a more detailed discussion of forward policy guidance.

[54]/ The inclination of some policymakers may be revealed by dissenting votes, but this may not be representative of the inclination of the others. In addition, unanimous votes (which are common for the BCCh) need not indicate a neutral inclination but could simply reflect close agreement about the level of the policy rate (or a preference for consensus).

[55]/ According to the expectations theory of the term structure, longer term (say five-year) interest rates are equal to the average of expected future policy rates over their (five-year) horizon. In addition, they also depend on a risk or term premium according to the liquidity premium theory.

By providing forward guidance, the central bank could influence expectations about future policy rates and thereby exert greater control over the longer-term interest rates that matter for economic activity.[56] Thus, transparency gives the central bank an additional tool that has the potential to enhance the effectiveness of monetary policy. So, it is not surprising that forward guidance has been used by central banks (including the BCCh) during the global financial crisis as the monetary policy rate reached its effective lower bound.

Forward guidance could be in the form of qualitative statements using specific code words or phrases (e.g. keeping the policy rate low for an 'extended period' or reducing monetary policy stimulus 'gradually', both used by the BCCh). Such an approach can be very flexible, but confusion about its precise meaning could limit its effectiveness. In addition, in practice central bankers tend to be asked in press conferences to clarify its meaning (such as the question about 'gradual' in the December 2018 Monetary Policy Report press conference), forcing them to provide more detail.

Quantitative forward policy guidance has the advantage that it is precise, which could greatly increase its effectiveness. But it also increases the risk that it may be misconstrued as a promise or commitment, and that it could tarnish the credibility of the central bank if its policy decisions deviate from it.

In general, the disclosure of forward guidance also reduces the informativeness of market expectations. This problem is worsened if the private sector becomes reliant on it and reduces its forecast efforts. This suggests that fuzzier forward guidance may be better. But relatively noisy forward guidance could increase volatility in financial markets and the economy. So, a careful consideration needs to be made of the merits and form of forward guidance.

There are two types of forward policy guidance, time-dependent and state-contingent, which each serve their own purpose. Time-dependent guidance provides information about the likely direction, timing or pace of monetary policy settings over time. For instance, a policy inclination (or bias) is informative about the likely direction of the next policy move, while calendar-based guidance is used to indicate that the policy rate is likely to stay at some (low) level until a specific date (both used by the BCCh). Publishing the projected policy path is the most comprehensive form of time-dependent forward guidance, providing information about the likely direction, timing, pace and also the long-run neutral level of the policy rate.

On the one hand, quantitative time-dependent forward guidance has the benefit of being clear and easy to communicate. It improves the short-term predictability of monetary policy actions, thereby reducing volatility in financial markets. Furthermore, by influencing expectations of future monetary policy settings, it allows the central bank to exert greater control over longer-term interest rates and thereby increase the effectiveness of monetary policy, especially when the policy rate is at its effective lower bound.

On the other hand, time-dependent forward guidance needs to be continuously adjusted as economic circumstances change, potentially reducing its credibility. In addition, such adjustments may be misinterpreted (e.g. forward guidance of easing signaling economic weakness) and become counterproductive (especially at the effective lower bound). Furthermore, the clarity of time-dependent forward guidance increases the risk of it being mistaken for a promise or commitment, thereby reducing the flexibility of the central bank.

[56]/ In the words of Woodford (2005), it enables the central bank to engage in the 'management of expectations'.

In practice, central banks have found ways to mitigate these issues through the way forward guidance is communicated. For instance, it is often stressed that forward policy guidance is an expectation or projection, not a promise or commitment. In case of the projected policy path, its uncertainty could be illustrated using a fan chart. And by supplementing forward guidance with macroeconomic projections, misinterpretations of adjustments can be reduced. In addition, it is often stated that the forward policy guidance is conditional on the current economic outlook, or its state-contingency is communicated in other ways.

State-contingent forward guidance provides information about the likely adjustment in monetary policy settings in response to changing economic circumstances. So, it helps the private sector to better understand the monetary policy reaction function and thereby improves medium-term predictability. Furthermore, the anticipation of monetary policy responses is reflected in asset prices, thereby speeding up the transmission of monetary policy and enhancing its effectiveness.

Such forward guidance could also be in quantitative form. For instance, instead of calendar guidance about keeping the policy rate low, a threshold for specific economic variables could be published, for instance for inflation (e.g. used by the Bank of Japan in 2001) or the unemployment rate (used by the Fed in 2012 and the Bank of England in 2013). This has the advantage that it provides flexibility and stabilization, because it automatically adjusts the expected length of the horizon in response to economic developments, extending it when conditions deteriorate, thereby reducing expected future policy rates and stimulating the economy. On the other hand, it makes the date of policy adjustments more uncertain, which could reduce its effectiveness. In addition, the threshold needs to be chosen carefully. Usually, escape clauses are added, and the threshold is not used as a trigger for immediate policy action.

Another form of state-contingent forward guidance is to provide scenario analysis by explaining how the policy rate is likely to be adjusted in specific circumstances (e.g. a global slowdown due to protectionist trade policies). The BCCh has started doing so in greater detail in the Monetary Policy Report since September 2018, but it does not always quantify the effects and the implication for the monetary policy rate is only described in qualitative terms.

A comprehensive form of time-dependent and state-contingent forward guidance could be provided by publishing the central bank's projected policy path, shown in a fan chart to illustrate the underlying uncertainty, and supplement it by scenario analysis that graphically shows the projected paths under the baseline and the most relevant alternative scenario(s), thus explaining key uncertainties and underscoring the conditionality of the policy rate projection. This helps to overcome potential pitfalls of each type of forward guidance. A good example is the way the Swedish Riksbank started publishing its projected policy path in 2007.

It may not be trivial to find agreement among central bankers about the projected policy path, but in practice this issue can be managed in a similar way as reaching a consensus about other macroeconomic projections. An alternative way of providing quantitative, time-dependent forward guidance is to disclose the forecasts of future policy rates by individual central bankers, such as in the 'dot plot' released by the Fed, which shows the dispersion of forecasts by calendar year. But the anonymous, unconnected dots tend to leave a cloud of uncertainty about the likely future policy path and the reasons for the dispersion in individual forecasts. Instead, publishing the committee's projected policy path together with scenario analysis is much more informative.

Note that publishing the central bank's macroeconomic model (MEP and XMAS for the BCCh), including the policy rule and estimates of the effects of certain types of shocks on the monetary policy rate is not a substitute for forward policy guidance. In practice, the economy is usually affected by a confluence of shocks of unknown magnitude. Moreover, model estimates cannot incorporate the central bank's judgment about the appropriate response in current circumstances. So, time-dependent and state-contingent forward guidance are still needed.

Forward policy guidance is an integral part of providing transparency about the monetary policy stance, so it is best communicated in the statement that announces the policy decision. The BCCh's forward guidance has usually been included in its MPM statement, although additional information is sometimes provided in the minutes or Monetary Policy Report.

Before the global financial crisis, the BCCh had sometimes used qualitative forward guidance, which was occasionally state-contingent, but mostly time-dependent and signaled the start or continuation of a change in the monetary policy rate.[57] But after the collapse of Lehman Brothers, the BCCh used it very actively, providing time-dependent forward guidance in all its MPM statements from December 2008 until mid-2011. First, it signaled and supported a very large monetary policy easing, from 8.25% to 0.50% in seven months. It clearly stated in July 2009 that 0.50% was the "lower limit" of the monetary policy rate and forward guidance was provided about staying at this level for a "prolonged period". Some "complementary monetary policy measures" were announced to support this, including the fixed-rate full-allotment six-month term liquidity facility FLAP and a half-year suspension of issuance of most BCCh debt securities. In November 2009 it was announced that FLAP would be gradually tapered and discontinued in May 2010, with some forward guidance about gradual monetary policy normalization in 2010Q2. The latter was supplemented by calendar-based guidance in December 2009 about holding the policy rate at its lower limit "at least until the second quarter of [2010]", which was maintained during 2010Q1. The start of normalizing monetary policy was signaled in May 2010 and it began the next month. Qualitative forward guidance was provided about the continued reduction of monetary stimulus and or "additional increases" in the policy rate until August 2011, when forward guidance was discontinued. So, during the global financial crisis and its aftermath time-dependent forward guidance was used very actively by the BCCh, which was mostly qualitative, but also included quantitative, calendar-based guidance for several months. The BCCh's use of forward guidance during this episode is discussed in greater detail in Appendix 10.

Forward guidance was resumed in 2014 from March until September with a policy inclination towards additional cuts.[58] It was sporadically used in 2015, but more frequently in 2016, with initially some fuzzy guidance about "gradual adjustments" in the monetary policy rate and a continuation of the "monetary policy normalization process", but in June and July it became much more specific when it was added that this would be "at the rate implicit in the baseline scenario of the most recent Monetary Policy Report",[59] where the policy rate path was assumed to be in line

[57]/ For instance, the MPM statement of 14 June 2007 stated: *"should a scenario involving inflation that is higher than projected in the last Monetary Policy Report materialize, it will be necessary to reduce monetary impulse."* [sic] After increasing the monetary policy rate by 25 basis points on 12 July 2007, the post-MPM statement switched from state-contingent to time-dependent forward guidance: *"The Board believes that, in the most likely scenario, it will be necessary to reduce monetary stimulus in coming months to keep projected inflation around 3% over the policy horizon."* Similar forward guidance of further tightening was provided in the statement of the meeting on 9 August 2007 with another 25 basis point rate hike.

[58]/ *"The Board will consider the possibility of making additional cuts to the policy rate in line with the evolution of domestic and external macroeconomic conditions and its implications on the inflationary outlook."*

[59]/ In the MPM statements of 16 June and 14 July 2016, "*The Board considers that the monetary policy normalization process needs to continue in order to ensure the convergence of inflation to the target, at the rate implicit in the baseline scenario of the most recent Monetary Policy Report. That rate could be altered, however, in the event of significant deviations in inflation convergence."*

with financial market expectations, which indicated tightening.[60] But in December 2016, the BCCh signaled a change in direction using forward guidance about increasing the monetary stimulus, which was followed by four 25 basis point rate cuts (starting in January 2017) with continued guidance about boosting the "monetary impulse" (until April 2017).

Guidance became more complex in September 2017, when the post-MPM statement suggested that the monetary policy rate would remain "around its current level" and begin "to rise toward its neutral level only after the economy begins to close the output gap", suggesting state contingence. At the same time, it was noted in four consecutive post-meeting statements that data were "consistent with the baseline scenario [of the September Monetary Policy Report] and the respective monetary stimulus". The latter was "similar" to the June Report, where the working assumption for the policy rate was vaguely described as "a trajectory consistent with different measures of expectations," (p. 9) which suggested a constant policy rate until mid-2018 with subsequent tightening. But statements from October until December qualified this by noting that the low level of inflation could require an adjustment in the monetary policy rate.

Since 2018 the BCCh has provided forward policy guidance at every MPM. Sometimes it has been state-contingent, including in February 2018 (withdrawal of 'monetary impulse' only once "the closing of the gaps is consolidated"), May 2018 (foreseeing to keep monetary stimulus at the current level "until macroeconomic conditions tend to consolidate the convergence of inflation towards 3%"), June 2018 (foreseeing to keep monetary stimulus and start to decrease it "as macroeconomic conditions keep driving inflation convergence towards 3%"), and June 2019 ("the onset of the [monetary policy rate] normalization process will depend on inflation clearly advancing to 3%").

For most meetings, forward guidance has been time-dependent, including in May 2018 (about the monetary policy rate returning "to its neutral level within the next few quarters"), September 2018 ("monetary stimulus should start being gradually withdrawn in the coming months"), October 2018 (begin in reduction of monetary stimulus), December 2018 and January 2019 (about continuing to reduce the stimulus "gradually and cautiously"), March 2019 (about "keeping the monetary stimulus for a longer time" and resuming normalization "gradually and cautiously") and May 2019 (about "keeping the monetary stimulus still for an extended period of time").

Occasionally, some conditional, quantitative, time-dependent forward policy guidance was provided in the minutes of the MPM, including about keeping the policy rate "at its current level during this year" (and a "gradual normalization towards neutral levels thereafter") in March 2018, when there was no explicit forward policy guidance in the post-MPM statement; and about "monetary stimulus remaining near its present levels at least for the rest of the year" in June 2018, when it supplemented state-contingent forward guidance in the post-meeting statement. It would be desirable to communicate such significant information when the policy decision is announced rather than in the minutes with a delay of two weeks.

In recent years, the BCCh has provided long-run, quantitative forward policy guidance by publishing its estimate of the neutral interest rate. The September 2016 Monetary Policy Report (p. 34) reported it to be between 1% and 1.5% in real terms. Presuming inflation expectations equal its 3% target,

[60]/ The June 2016 MPR detailed that *"expectations inferred from financial asset prices indicate that the first increase of 25 basis points would occur toward the end of this year or the beginning of 2017, while the second increase would come in a little over a year"* (p. 17).

the BCCh translated this into an estimated neutral monetary policy rate of 4% to 4.5%,[61] and used this to communicate how expansionary its policy stance was. This is problematic, however, when short-term inflation expectations are significantly different from the 3% inflation target. For instance, a policy rate of 2.5% may look quite expansionary as it is 150-200 basis points below the neutral rate, but if short-term inflation expectations are 2%, then it implies a short-term real interest rate of 0.5%, which is only 50-100 basis points below the estimated neutral real interest rate. Thus, although publishing the neutral monetary policy rate improves transparency, great care needs to be taken when using it to evaluate how expansionary the policy stance is.

Overall, the BCCh has used forward policy guidance on many occasions, including during the global financial crisis. The MPM minutes show that the BCCh Board considers it to be part of the monetary policy options they decide about. Furthermore, in recent years the BCCh has provided significantly more forward guidance. Nevertheless, the status of the "working assumption" for the monetary policy path used for the macroeconomic projections and its relation with forward guidance need urgent clarification. The BCCh has several options to enhance transparency in this respect, each of which would be a significant improvement on the present situation.

The BCCh could use market or survey expectations of the monetary policy rate as the working assumption for its macroeconomic projections. This could be supplemented by some qualitative time-dependent forward policy guidance if the Board's expected policy rate path differs significantly, or otherwise more detailed state-dependent forward guidance. In this case, there is no need to reach consensus on the Board's projected policy path or publish it.

Instead, the BCCh could continue to use a policy rate path based on a policy rule as working assumption but publish it to provide transparency about its macroeconomic projections. If this path does not fully reflect the views of Board Members, it could be supplemented by some time-dependent forward guidance in addition to more detailed state-contingent guidance. Again, this has the advantage of separating the working assumption from the Board's views, although this distinction may be more challenging to communicate in this case.

Or the Board could publish its projected policy path in a fan chart and use it for its macroeconomic projections, supplemented by scenario analysis to show how the policy path is likely to deviate from the baseline or consensus projection in some specific, realistic alternative scenario(s). This can be used to explain key risks, to provide greater insight into the Board's monetary policy reaction, and to reflect diverse views about the future policy path among Board members, which is often due to different assessments of future risks. Thus, the BCCh would systematically provide comprehensive time-dependent and state-contingent forward guidance.

4.5. Overall Assessment

This section provides an overall assessment of BCCh monetary policy transparency and communications in three respects. It first reviews the performance of the BCCh in terms of the monetary policy transparency index of Dincer, Eichengreen and Geraats (2019) and provides an international comparison with other inflation targeters. It then assesses the credibility of the BCCh's inflation target. Finally, it analyzes the predictability of the BCCh's policy rate decisions.

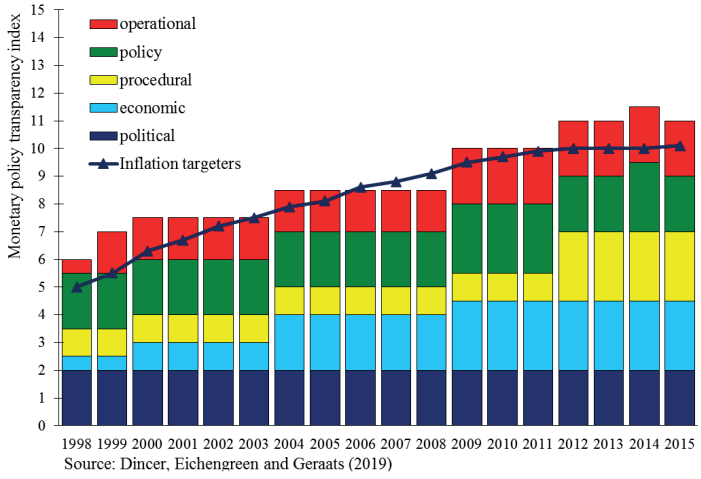
[61]/ For instance, this estimate of the neutral monetary policy rate was explicitly mentioned in the Summary of all Monetary Policy Reports in 2018.

4.5.1. Monetary Policy Transparency

Dincer, Eichengreen and Geraats (2019) provide a measure of monetary policy transparency that assesses to what extent information that is pertinent to monetary policymaking is publicly available (in English) for 112 central banks, covering nearly 150 countries, from 1998 until 2015.[62] Following Geraats (2002), it distinguishes five aspects of transparency: political, economic, procedural, policy and operational. Each is measured using a subindex with a maximum score of three, and the overall monetary policy transparency index sums them, so it has a maximum score of fifteen. The index for the BCCh and its decomposition is shown in Figure 9, together with the average score of inflation targeters in the sample, based on the IMF's *de facto* classification of monetary policy frameworks in 2015. The BCCh's score has greatly increased from 6 in 1998 to 11 in 2015, and mostly been above the average for inflation targeters around the world, which rose from 5 to 10.

Figure 9.

BCCh Monetary Policy Transparency.



Source: Dincer, Eichengreen and Geraats (2019)

There has been no change in the BCCh's score for political transparency as there has been a formal statement and quantification of monetary policy objectives and explicit instrument independence throughout. Its score for economic transparency has greatly increased because the BCCh started regularly publishing its medium-term macroeconomic projections for inflation and GDP growth in 2000 (in the Monetary Policy Report), increased this to quarterly frequency in 2009, and published the macroeconomic models it uses for monetary policy analysis (BCCh, 2003). It would achieve the full score in this respect by providing an annual update of its estimate of the neutral interest rate and quarterly time-series for its estimate of the output gap in English. The BCCh also greatly increased its procedural transparency by publishing its monetary policy strategy in 2000 and releasing minutes including individual voting records two weeks after the MPM since 2012 (in English). It further improved its transparency and got full marks in this respect by including individual voting records in the MPM statement since 2018. In terms of policy transparency, the BCCh has provided a prompt announcement and explanation of its monetary policy decisions throughout, but its use of forward guidance has been less regular, leading to variation in this score. Since 2018 the BCCh has provided forward guidance for each MPM, leading to a policy transparency score of 2.5. Using quantitative forward guidance would

[62]/ This index updates and extends those by Eijffinger and Geraats (2006) and Dincer and Eichengreen (2014).

result in full marks in this respect. Finally, the BCCh's score for operational transparency rose in 2009 due to the quarterly release of its Monetary Policy Report. It could further improve in this respect and achieve full marks by providing a discussion of its forecast errors as part of an annual evaluation of its macroeconomic forecasts (as recommended by the Panel), and by providing a more thorough evaluation of macroeconomic outcomes in light of its monetary policy objectives, including an explicit account of the contribution of monetary policy in achieving its objectives (at least annually).

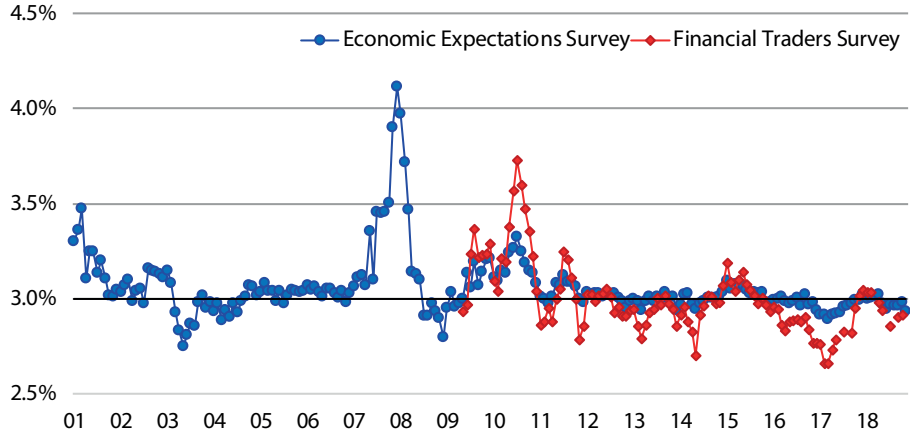
Overall, the BCCh has shown a large increase in monetary policy transparency during the last two decades based on the Dincer, Eichengreen and Geraats (2019) index and its score has largely been above the average for inflation targeters. The recent improvements in procedural and policy transparency it has implemented since 2018 have further raised its score to 12, doubling it compared to 1998.

4.5.2 Credibility of Inflation Target

One way to evaluate whether the BCCh's monetary policy actions and communications have been effective is to assess the credibility of its inflation target. The BCCh's EES and FTS ask survey participants for their expectations of CPI inflation two year ahead, which should equal 3% if the BCCh's price stability objective to achieve its inflation target over its two-year policy horizon were perfectly credible. Figure 10 shows that the average survey response in the EES and pre-MPM FTS has mostly been very close to 3%, so medium- term inflation expectations have largely been well-anchored to the inflation target.[63]

Figure 10.

Credibility of BCCh Inflation Target.



Note: Average survey responses for two-year-ahead CPI inflation expectations, 9/2001-6/2019. Financial Traders Survey prior to monetary policy meeting.

Source: BCCh.

[63]/ It has been within 0.1 percent point for 75% and 54% of the months for the EES and pre-MPM FTS, respectively, although 48% for the post-MPM FTS. The median response equaled 3% for 87% and 49% of the months for the EES and FTS, respectively.

Nevertheless, Figure 10 shows that there have been several occasions in which two-year ahead inflation expectations from the EES or FTS deviated significantly and persistently from the BCCh's 3% target: during 2001 (when EES expectations reached 3.5%), during 2008 (when EES expectations peaked at 4.1% in August, while CPI inflation was over 9%), during the first half of 2011 (with FTS expectations rising to 3.7% in March), and during the second half of 2017 (with FTS expectations declining to 2.66% in November, when CPI inflation had remained below 2% for several months). So, on some occasions EES and especially FTS respondents have shown significant doubts about the BCCh's ability to achieve its 3% inflation target by the end of its two-year policy horizon.

These results, however, need not mean that people doubt the BCCh's commitment to achieving its inflation target; they may just believe it will take the BCCh longer than two years to do so. The reason could be that the effect of shocks is highly persistent (e.g. due to partial indexation to inflation), or that monetary policy takes longer than two years to have its full effects due to lags in its transmission mechanism.[64] To assess this, it would be useful to have longer-term survey expectations for CPI inflation (e.g. three or five years ahead), especially for the FTS (because it shows much more variability in two-year ahead inflation expectations that the EES). This would provide a more robust measure of the credibility of the BCCh's inflation target.

The point estimates (and their dispersion), however, are not informative about the individual uncertainty faced by survey respondents. For instance, nearly all survey participants may agree that the point estimate for CPI inflation two years ahead is 3%, but that this outcome has become much less likely (e.g. due to a more volatile external environment or perhaps a reduction in central bank credibility). So, it would also be desirable to better assess uncertainty about the inflation outlook by asking survey respondents to indicate the likelihood of different inflation outcomes at a specific horizon, like the *Survey of Professional Forecasters* (SPF) in the United States and for the eurozone. In that case, it would be possible to construct a direct measure of the credibility of the BCCh's inflation target: the likelihood with which CPI inflation will be between 2% and 4% in two to three years, according to survey participants.[65]

Another possibility is to derive market expectations and their uncertainty from financial asset prices (e.g. 'breakeven inflation' based on peso and UF bond yields, or using inflation or interest rate swaps and options). This has the advantage of being available at high frequency. On the other hand, such measures are only reliable if financial markets are fully efficient so that they immediately reflect all available information, and do not suffer from any significant frictions or disruptions. This is unlikely to be the case in an emerging market economy like Chile. And even in advanced economies, such as the eurozone, market expectations based on financial asset prices proved to be seriously distorted during times of financial turmoil, precisely when reliable measures are most needed.[66]

As a result, *the Panel recommends that the BCCh extends the horizon for inflation expectations in the Financial Traders Survey (FTS) to at least three years to have a more reliable measure of the credibility of its inflation target.*

[64]/ These are also reasons why it may be sensible to allow flexibility to sometimes extend the policy horizon beyond two years, as recommended by the Panel.

[65]/ This is similar to the measure of credibility proposed by Geraats (2010a) for the European Central Bank.

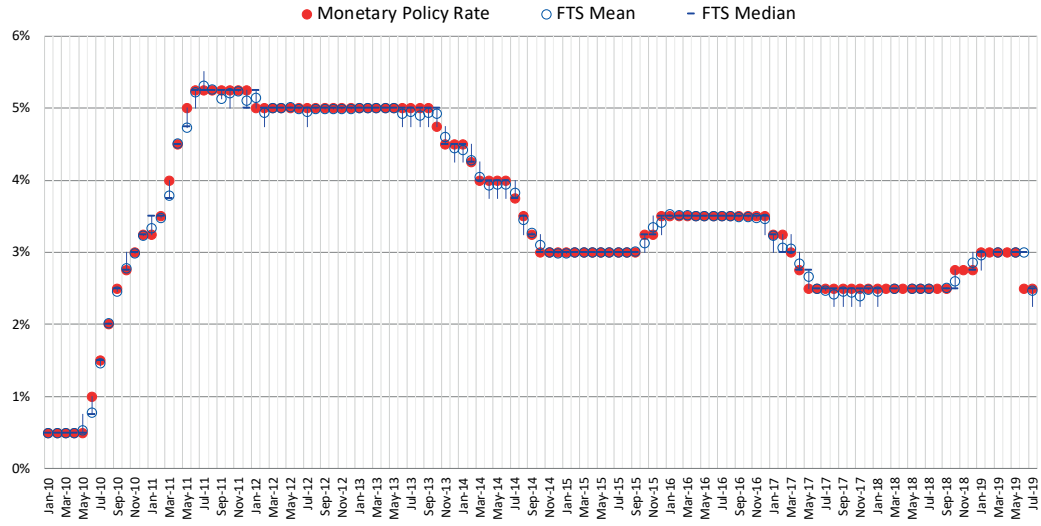
[66]/ Geraats (2010b) found that medium- and long-term inflation expectations for the eurozone derived from financial asset prices were volatile and often unreliable during the 2008-2009 financial crisis, even providing signals that were opposite to those based on the *Survey of Professional Forecasters* of the European Central Bank.

4.5.3 Monetary Policy Predictability

A benefit of monetary policy transparency is that it makes policy decisions more predictable. This reduces financial market volatility. In addition, the anticipation of monetary policy actions is reflected in financial asset prices, thereby speeding up the transmission of monetary policy and enhancing its effectiveness. To assess whether monetary policy decisions by the BCCh are anticipated, Figure 11 shows the monetary policy rate and expectations of it from the FTS conducted shortly before each MPM (since 2010), including the mean and median responses and the range spanned by the first and ninth deciles.[67] It shows that the BCCh's policy rate decisions are usually very well anticipated. In fact, for 90% of MPM since 2010, most FTS respondents correctly predicted the policy rate before the MPM. And for more than half of meetings (55%), the policy rate was correctly predicted by at least 80% of respondents (so the first and ninth deciles equal the policy rate).

Figure 11.

Predictability of BCCh Monetary Policy Decisions.



Note: Monetary policy rate and mean, median and 1-9 deciles from Financial Traders Survey (FTS) held before each monetary policy meeting. Source: BCCh.

Nevertheless, on several occasions the monetary policy decision came as a surprise. Typically, the policy rate move was more than anticipated. A few times (in June 2010, March 2011 and May 2011), the BCCh decided to move by 50 basis points, while most expected a 25 basis point rate change. Or a 25 basis point change was decided, while most had expected no immediate change (in January 2012, October 2013, May 2017 and October 2018). In a few cases, a 25 basis point rate change was anticipated by most, but did not take place yet (in January 2011, December 2011, February 2017). But in all of these cases, the policy decision did not come as a complete surprise and was expected by at least 10% of FTS participants.

[67]/ Alternatively, financial market responses to announcements of monetary policy decisions could be used. But this is complicated by the fact that they take place outside financial trading hours and that financial market liquidity and efficiency is sometimes limited in emerging markets like Chile, as evidenced by often sizeable moves that are reversed the next day.

There was only one monetary policy decision by the BCCh during the last decade that came as a great surprise: the 50 basis point rate cut in June 2019. None of the 58 FTS respondents expected this, and only one was expecting a 25 basis point rate cut. In addition, only 12 were anticipating a lower policy rate by September 2019, although 21 were expecting so by December 2019. Not surprisingly, the financial market response was strong–the next trading day, the average interbank swap rate dropped by 34 basis points and the two-year BCP nominal bond yield by 32 basis points, while the two-year yield on the UF-indexed BCU bond fell by 20 basis points.

The BCCh had announced in advance (in March and May) that it would revise its estimates of potential output and the neutral interest rate for the June meeting, but it did not show its hand through forward guidance; in March it mentioned "keeping the monetary stimulus for a longer time" but still "towards the medium term" resuming normalization "gradually and cautiously", while in May it referred to "keeping the monetary stimulus still for an extended period of time". To better prepare people for the possibility of such a large move, the scenario analysis in the March Monetary Policy Report could have considered the implications of a revision of the BCCh's estimates of potential output and the neutral policy rate for the monetary policy rate. The BCCh likely already had an inkling of the direction of the revision of these structural parameter estimates. It could also have used speeches by Board Members to draw attention to the importance of these structural parameter estimates for monetary policymaking. It ended up doing so only after the 50 basis point June rate cut, explaining it was necessary to "recalibrate the monetary impulse".

This large surprise rate cut has lowered expectations of future monetary policy rates, but it has also reduced medium-term inflation expectations. In the pre-June-meeting FTS, the median expectation for two-year-ahead CPI inflation was 3%, but it dropped to 2.8% in the post-meeting FTS, with only 30% of respondents expecting CPI inflation to equal 3% in two years. Apparently, FTS respondents thought that the 50 basis point rate cut was not sufficient to achieve the BCCh's target by the end of the two-year policy horizon, in contrast to the neutral bias in the monetary policy meeting statement of 7 June 2019.[68] Indeed, in the post-meeting June FTS, most were expecting a further rate cut of 25 basis points in October.

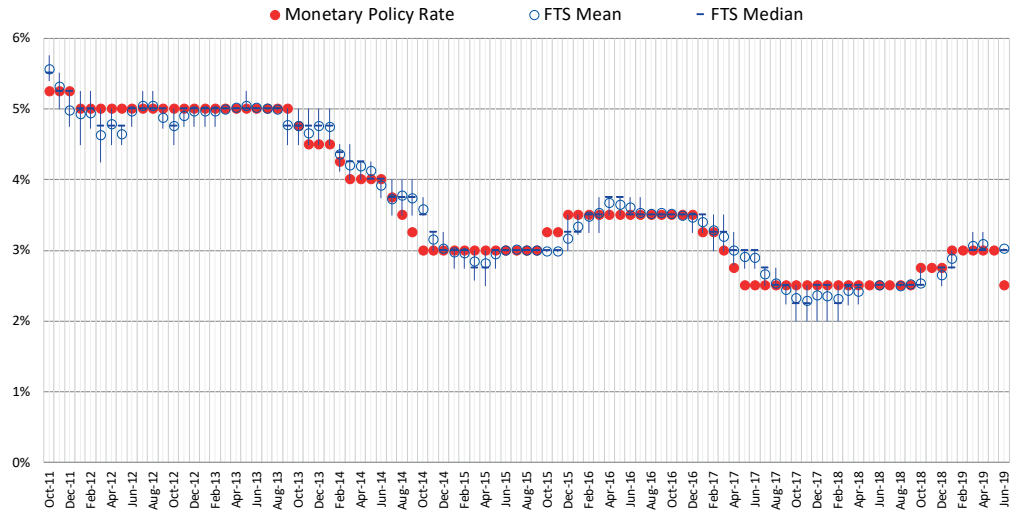
The predictability of policy decisions beyond the next meeting is generally considerably lower, but for the majority of meetings (nearly 60%), most FTS respondents correctly predict the policy rate three months in advance. Figure 12 shows the monetary policy rate and three-month-ahead FTS expectations (again using pre-MPM surveys), including the mean and median responses and the first to ninth decile range.[69] The latter range is mostly 25 basis points, but for nearly 30% of monetary policy decisions it equals at least 50 basis points, revealing a large dispersion of expectations about the policy rate three months ahead.

[68]/ *"The Board estimates that, if the baseline scenario materializes, this change in the [policy rate] will suffice to ensure the convergence of inflation to the target in the policy horizon."*

[69]/ The sample starts in October 2011 due to more limited availability of FTS data at this horizon.

Figure 12.

Predictability of BCCh Monetary Policy Decisions Three Months Ahead.



Note: Monetary policy rate and mean, median and 1-9 deciles from Financial Traders Survey (FTS) three months before monetary policy meeting. Source: BCCh.

There have been several cases in which the policy rate decision was a big surprise at the three-month horizon and had been correctly predicted by less than 10% of FTS participants, including for the decisions in October 2011, May 2012, September and October 2014, October and November 2015, May and June 2017, and June 2019. The often large uncertainty or disagreement among forecasters at the three-month horizon indicates that the BCCh would benefit from focusing more on explaining its likely monetary policy reactions, including through state-contingent forward guidance, so that it becomes easier to anticipate its policy decisions in the months ahead. In short, overall there is clearly room for further improvements in the BCCh's monetary policy communications.

PART II: FINANCIAL STABILITY

5. FINANCIAL REGULATORY STRUCTURE, POLICYMAKING PROCESS AND TOOLS

5.1. Regulatory Structure

The BCCh has begun operating under an altered regulatory structure following passage of the new General Banking Law passed in January 2019. The new Law consolidated oversight of banking, insurance, and market conduct in the Financial Market Commission (CMF). And it gave the CMF and the BCCh instructions to implement the Basel III regulations for banks. In doing so, it deepened and extended an existing regime of "co-responsibility" in which the authority—the BCCh or the CMF—issuing the regulation requires the prior agreement of the other authority for implementing certain specified and critical aspects of the Basel III and other aspects of financial and regulation.

The BCCh, broadly speaking, has responsibility for the resilience of the banking system as part of the overall financial system. It already publishes a Financial Stability Report identifying risks to the financial system. It also runs the concurrent stress tests of the banks. Under the new Law, it also has been given responsibility for establishing a methodology for setting the countercyclical capital buffer (CCyB) and then making decisions on the specific level of the buffer, subject to the opinions of the CMF. The CMF has microprudential responsibility—looking after the safety and soundness of individual banks and insurance companies. With respect to banks it will determine how to implement the other elements of Basel III, but for many of these elements related to the overall strength of the system, it will need a favorable prior opinion of the BCCh.

Having more than one agency as the decision-maker is not uncommon in financial regulation—the United States is an extreme example with three bank regulators at the federal level—but the need to find common ground in such a setup can lead to delay and inaction.

One key to the successful operation of the co-responsibility regime will be close consultation between the agencies as each authority comes to decide on what to propose. The establishment of the CMF as a new body affords an opportunity to set the tone and terms of this cooperation and consultation. Financial stability is a joint responsibility and macroprudential measures, such as the CCyB often entail a "macroprudential finish" to microprudential measures, like capital requirements in the case of the CCyB; and the setting of several elements of Basel III by the CMF, like G-SIB buffers (for global systemically important banks), can have a critical effect on how the BCCh views the overall stability of the banking system. It is critical that each authority understand the perspective and decision-making process of the other and that each feels free to consult and utilize the expertise of the other as they determine the parameters of the rules for which they are responsible. The coordination is necessary also because the targets and instruments of policy of each entity affect those of the other. Even beyond the regulatory interactions just discussed, monetary policy actions affect credit market conditions and the evolution of aggregate credit in the economy, while macrofinancial and microfinancial policy actions can affect inflation and economic activity (see for example Carrillo et al., 2018). Hence, in order to manage both macrofinancial and monetary policies efficiently, both authorities need to have sufficient staff with strong technical skills and an ability to understand the reasons for and likely consequences of the decisions of the other, and they need to have continuous communication to share data and knowledge.

The Panel understands that mechanisms for this sort of consultation are being established and *we recommend that ways be pursued to build a productive relationship that will facilitate close working on the staff and decisionmaker levels.* That will be required to implement the new rules in a timely manner.

This will have many dimensions, including agreements to share data as well as analysis. For one example, the BCCh is still determining how it will implement the CCyB. It seems possible that the concurrent stress tests the BCCh currently runs will play a role. Making the stress tests a more cooperative endeavor, as for example it is in the UK, is likely to be helpful. Stress tests have both micro and macroprudential elements; they may well gain in effectiveness and efficiency if the authorities cooperated closely in their construction and execution.

Another way to overcome the inertia and inaction bias that the Panel is concerned about might result from co-responsibility is a high level of transparency about the interactions among the authorities. *The Panel recommends the timely publication of any proposed regulation or setting of a measure and its rationale, alongside the response of the other agency and its rationale*. The public, including the legislature, has a right to know how each agency is executing its role and to judge the implications of the position of the agency for financial stability in Chile. Prompt publication of proposals and responses should sharpen the reasoning and incentivize agencies to cooperate beforehand and speed the process.

5.2. BCCh Financial Policymaking Process

The BCCh has a sound conceptual framework for addressing financial stability risks. Like other central banks and authorities with responsibility for financial stability, it identifies risks or shocks that could hit the financial system, assesses the vulnerability of the system to such shocks, and judges what and whether regulatory changes are required to build enough resilience to adequately protect the stability of Chile's financial system. It uses a variety of techniques to make these judgments, including indicators, models and bank stress tests. As discussed below, the Panel identified several important improvements that are needed to these techniques, especially as it adapts to its expanded responsibilities and the new regulatory structure put in place by the new General Banking Law.

The decision-making process resembles that for monetary policy but is less well developed; reflecting how recently the BCCh has been given new responsibilities. As with monetary policy, staff use multiple meetings to bring analysis and evidence to the Board, which decides how to respond. Our impression was that on the staff level, roles and resources were still being worked out and that the quality of the staff input to the Board could be improved by more cooperation across staff functions. The recent reorganization of the Financial Policy Division (FPD) is a welcome change in this regard. The rearrangement to form "Gerencias" within FPD specialized in specific areas and with their own staff and management structure, in parallel with what is done in MPD, is a significant improvement. The Head of the Financial Policy Division has the responsibility for working across staff lines and organizing material for the Board as it carries out its financial stability roles; this should be helpful in cutting through staff "silos" and being point of accountability. The Board might consider to formally institutionalize this function.

Only the entire Board can make decisions for the BCCh, but the Board may also consider whether with the expanded financial stability responsibilities it should designate one or a few of its members

to provide preliminary feedback to the staff and to make sure the appropriate material and choices are getting to the Board. Many central banks that have substantial responsibilities for both monetary policy and financial regulation are organized this way—for example the Deputy Governor for Financial Stability at the Bank of England and the Vice Chair for Supervision at the Fed. Such a person might also play a useful role in developing the close working relationship with the CMF discussed above.

5.3. Financial Stability Policy Tools

The Chilean authorities are putting in place the financial stability tools embodied in the Basel III capital regime, which will strengthen the banking system. Still, the BCCh had to take unusual actions to safeguard financial stability in the crisis and the Panel identified several areas in which additional actions seem advisable to protect financial stability in the future. The Panel is not judging where new tools should be housed—whether at the BCCh, the CMF, or another entity. We assume co-responsibility will continue to operate so that, as a minimum, the BCCh would be closely consulted before any new tools were used. Utilizing the BCCh's macro focus and economic expertise would greatly increase the odds on the successful deployment of any of these tools. The Financial Stability Council (FSC) should facilitate coordination among the various authorities.

The Panel recommends that the BCCh, the CMF, the government and legislature put in place tools or arrangements in the following areas:

Implementing Existing Authorities

Counter-cyclical Capital Buffer. The BCCh and the CMF need to agree on the framework for regular consideration and timely adjustment of the CCyB.

Lender of Last Resort. An important task of central banks is the ability to act as a *Lender of Last Resort* (LOLR) when a bank encounters liquidity problems. The BCCh will be the lender, but the shared responsibility of the BCCh and the CFM in protecting the financial stability of banks requires close coordination to allow prompt and effective action when deemed appropriate. To facilitate speedy response, *a protocol needs to be drafted on the process leading to and acting as a LOLR.* A key element of that is sharing the relevant information.

To facilitate speedy action in terms of stress *it is important to conduct exercises of LOLR and crisis management together with other players* (the last exercise was conducted in 2012).

New Tools

Orderly resolution of systemically important banking organizations. By definition the failure of a systemically important institution will have adverse spillovers to the rest of the economy. Under Basel III, the CMF, with the prior approval of the BCCh, will be applying higher capital requirements to banks whose problems would involve such externalities. But in some situations, particular to the institution or part of more general severe financial stress, that may not be enough to sustain confidence in the institution. In those circumstances, sustaining the essential functioning of the institution and insulating the economy from its troubles could well require more capital, as well as liquidity support from the BCCh. One source for that capital is the bail-in of senior debtholders—

after the government takes control of the organization to preserve the functioning of the pieces whose failure would have adverse consequences for the whole economy. Such an orderly resolution is preferable to the alternative of taxpayer bailout. And the requirement to issue debt that could be bailed in under controlled conditions would bring market discipline to bear on organizations that otherwise might be viewed as too big to fail. Resolution authority is considered an essential element of internationally agreed post-crisis reforms ending too big to fail.

Oversight of nonbank lenders. In its Financial Stability Report, the BCCh catalogues the rapid growth of nonbank lenders to households. Often these are retailers using credit to boost sales. To be sure, the failure of one of these lenders may not yet rise to the level of a systemic event, but the economy could feel the effects if problems with one led to contagion with the others. And, as capital requirements come into line with Basel III, more credit could migrate outside the banks. At a minimum, the authorities should be sure they are gathering good information about nonbank lenders and make regular systematic reviews of risks beyond the banking sector with a view to assessing whether the regulatory perimeter should be adjusted to preserve financial stability.

Credit registry. The rise of nonbank lenders to households makes it more difficult to have visibility into the total indebtedness of an individual borrower. Borrowing is tracked across banks, but not across banks and nonbanks. In its Financial Stability Report, the BCCh recommends that a credit registry be created that encompasses the debt of households wherever incurred. The Panel agrees with this recommendation; a comprehensive credit registry would contribute to financial stability by enabling lenders to better manage risks and by giving the authorities greater insight into the evolution of indebtedness and household debt service obligations. The FSC would be the institution that should promote the establishment of a registry and define the required legislation.

Authority to implement macroprudential LTV and DTI regulation. Many episodes of financial instability begin with problems in the residential mortgage market—as it did for the United States in 2008. A mortgage is the largest financial obligation of most households and lending against residential real estate is often the largest category of lending on the balance sheets of banks. When real estate prices are rising banks and other lenders often compete for market share by easing the terms and conditions of mortgages, counting on rising collateral values to secure the loan. Households in real estate booms, encouraged by easing terms, tend to take on rising debt burdens to finance the rising real cost of housing, to use the higher collateral value to fund higher levels of consumption, or to increase their investment in real estate through larger homes or second properties for recreation or rental use. When the cycle of real estate prices turns down, banks cut back credit across the board when they suffer losses from loans that are under water and not performing, and heavily indebted households reduce consumption sharply—in both cases, amplifying the downward shock to the economy. The CMF has authority to impose loan-to-value (LTV) regulation on residential mortgages, but its focus is on micro-prudential considerations. Credit booms, and in particular housing booms and mortgage markets, have been an important source of financial instability. Thus, it is important that macroprudential considerations also be taken into account in designing LTV and debt-to-income (DTI) regulation. *The Panel recommends that the BCCh has the power to initiate recommendations to impose such restrictions for macroprudential purposes.* It is important for some authority to have the ability to constrain the growth of high-risk loans through limits on loan-to-income, loan-to-value, or debt service ratios when increases in those measures are seen to pose a threat to financial stability.

6. FINANCIAL STABILITY ANALYTICAL FRAMEWORK AND TOOLS

For the purpose of macroprudential policy management, this new institutional arrangement assigns the BCCh the main task of constructing and managing the framework for implementing the CCyB (as mentioned above, leaving the CMF with the right to veto the activation of the CCyB upon review of the BCCh's proposal). The new General Banking Law mandates that the BCCh must be ready for the implementation of the CCyB by the end of 2020, which imposes a tight schedule on the plans for developing the modeling infrastructure that will support it.

The new regulatory environment requires both entities (CMF and BCCh) to build strong expertise in modeling and effective lines of communication with each other. The setup also imposes strong data requirements on both entities, and in this context the lack of a credit registry that could provide extensive granular data for assessing activity and health in credit markets is an important limitation (see a recommendation above). Improvements in data collection are also needed to ensure that there is sufficient information pertaining to all relevant financial intermediation activities, including the activities of nonbank financial intermediaries and shadow banks.

6.1. Existing Analytical Tools

The current setup for financial stability surveillance and financial policy management on the side of the BCCh includes a reduced-form restricted VAR model relating macro and financial variables that is used for stress tests. There are also models that shed light on financial risks in the household sector and in non-financial corporations.

With regard to stress testing, the goal is to assess the effects of aggregate shocks on the stability of the banking system, focusing on both credit and market risks (so far liquidity risk is not included). Market risk (including currency, valuation and repricing risks) is evaluated using balance sheet information to determine the exposure to potential losses in response to macro shocks. Credit risk is evaluated using the reduced-form model mentioned earlier. This is a VAR model that relates capital provisions, credit growth and penalties (all three broken down for commercial, consumption and housing credit) to macro variables. The latter include the index of economic activity, short- and long-interest rates, the dollar exchange rate, home prices, effective loan-to-value in mortgages (defined as the ratio of mortgage loans to home prices) and unemployment. The VAR was updated last in 2017 (see Martínez et al., 2017), at which time several aspects of the econometric estimation were improved (e.g. the improved coverage of the housing sector), and with this update the BCCh also added two indicators to supplement the VAR results: coverage ratios for the flow and stock of nonperforming loans.

The VAR is used for stress testing assuming a "severe event" scenario with the following characteristics: (1) a drop in quarterly GDP growth of 6.6 percentage points (as in the Global Financial Crisis), relative to the baseline scenario in the latest Monetary Policy Report, (2) a 300 (100) basis points shock to the short-run (long-run) interest rate, and (3) a 20 percent currency depreciation (in line with the largest 15-day depreciation of the USD observed since 2000). An alternative "adverse" scenario has also been considered since 2017. It features persistent weak growth, which is based on the 5th percentile of the distribution of the GDP forecast in a recent Monetary Policy Report, but this is not always the latest available (e.g. the May 2019 Financial

Stability Report used the December 2018 Monetary Policy Report forecast). Since the VAR model is defined at the level of the aggregate banking system, the stress-testing framework applies the dynamics of the stress scenario to individual banks using 12-month averages of each month's data.

Some important concerns with the VAR stress-testing model are worth noting. First is the extent to which the stress assumptions for the 'severe' scenario should incorporate some elements from the most severe financial event in Chile, which was the 1982 crisis. The movements in the three variables used for the severe scenario where significantly larger in that case, but improvements in the institutional framework for monetary, fiscal and financial policy mean that the effects would probably not be as strong. Nevertheless, the severe scenario should capture a systemic crisis, featuring significant bank failures or a severe sudden stop.

Second, the model abstracts from incorporating movements in external factors, particularly foreign capital inflows, copper prices or world interest rates. These may be more informative predictors of economic activity at higher frequencies than national accounts indicators or the monthly index of economic activity (IMACEC). In addition, they may help capture effects driving systemic *sudden stops* at a global level. It is true that in general equilibrium one would expect the variables already included in the VAR to respond to these external factors. However, considering alternative stress-testing models where these external factors are added to or substitute for those variables could be very informative.

The third concern is the partial-equilibrium nature of the exercise. In the dynamics of actual financial crises, the responses of macroeconomic variables are driven by non-linear, feedback amplification mechanisms (e.g. successive rounds of drops in asset prices driven by fire sales, margin calls, mark-to-market capital requirements etc.), and these mechanisms are not well approximated by the VAR framework used for stress testing.

Finally, the coverage of the exercise is limited to the banking system. Given the growing relevance of credit provided outside of the traditional banking system, *it would be important to explore ways of extending the analysis to consider possible risks for banks that may be underestimated in the current stress-testing framework because of this.*

It is also worth evaluating the robustness of the VAR structure. As currently estimated, the model assumes that the variables in the macro block are independent of those in the financial block, but those in the financial block depend on the macro block (i.e. the macro variables do not respond to lags of any of the variables in the financial block while the financial variables do respond to lags of the macro variables). This is implicitly an identification assumption that implies that the macro variables do not respond to changes in the variables included in the financial block, either contemporaneously or with lags. This can be particularly important with respect to loan growth (recall the VAR uses aggregate loan growth across all banks). Several theories of the credit channel and financial transmission would predict that output and credit are jointly determined. *Hence, credit ought to be a variable that affects output contemporaneously and with lags, just as output affects credit.*

6.2. Framework for Management of CCyB

The framework for implementation of the CCyB is still under development with the aim of meeting the December 2020 deadline. The BCCh is developing a framework based on the "hybrid strategy" proposed at the Bank of France in the work of Bennani et al. (2017). This strategy combines a model of early warning indicators (EWI, to assess the likelihood of adverse credit events) with the

stress-testing model (to quantify the effects of the adverse events on individual banks) with a DSGE model with financial frictions (to quantify the effects of activating the CCyB via counterfactual exercises). At this stage, the BCCh has made substantial progress with the EWI and stress-testing models but less so with the DSGE model (this is covered in detail in Section 6.4 below). Chapter IV of the second Financial Stability Report of 2017 and the paper by Martínez and Oda (2018) document the work that has been done so far in examining financial cycles and early warning indicators for Chile and discuss several hurdles that are being faced.

The Bank for International Settlements (see Annex 1 in *Guidance for National Authorities Operating the Countercyclical Capital Buffer*; BIS, 2010) recommends using as guide for the CCyB the "credit gap" defined as the deviation from trend in the credit-to-GDP ratio for the broadest measure of credit available. The trend is to be constructed with a one-sided Hodrick-Prescott filter with smoothing parameter set to 400,000 based on the conjecture that financial cycles last 20 years. The BIS recommends activating the CCyB when the credit gap exceeds 2 percent and then tightening it linearly to reach its maximum when the gap reaches 10 percent. Country authorities have discretion, however, to choose their own measures of credit gap and their own activation and maximum thresholds.

The BIS recommended CCyB guidance methodology has four important drawbacks:

I. It proposes detrending the credit-GDP ratio, which misrepresents credit fluctuations if credit and GDP display different trends.

II. The high smoothing parameter results in over-smoothing and deviations from trend with long duration that counterfactual experiments have shown to result in the CCyB being active for too long and at levels higher than needed, even during recessions.[70]

III. The activation and maximum thresholds should be adjusted to the characteristics of each country's credit cycle, instead of using 2 and 10 percent as one-size-fits-all metrics (since credit in emerging markets is significantly more volatile than in advanced economies, 2 and 10 percent are much more restrictive for the former than the latter).

IV. The BIS methodology retains low-frequency movements in the credit-GDP ratio, making it inaccurate for separating "over-borrowing" situations from "normal" credit cycles and benign low-frequency credit movements, which can result in unintentionally punishing structural changes that enhance credit market efficiency and financial development.

The BCCh's analysis (chapter IV of Financial Stability Report 2017H2) encountered some of the above limitations and concluded that applying the BIS methodology in Chile would be inadequate. In particular, the CCyB would have been activated in late 2013 and set to its maximum since early 2014. In addition, it would have been active and set at its maximum from late 1995 to the end of 2002, which includes the recession triggered by the 1990s *sudden stops*. In contrast, the BCCh documents that the recent rise of the overall credit gap in Chile can be traced to FDI-related loans

[70]/ The BIS (2010) application of its CCyB methodology to UK data shows that the credit gap increased consistently between 1981 and 1990, crossing the 2 percent activation threshold in 1983, reaching a peak of 20 percent in 1990 and not moving below 2 percent until 1993. The CCyB would have been active for 10 years and 7 of those years it would have been at its maximum, including during the 1990-1991 recession years that featured six consecutive quarters of negative growth and unemployment rising from 6.9 to 10.7 percent!

and overseas bond issues by firms that are matched with overseas investments, both of which are not regarded as major signs of financial vulnerability.

The BCCh also found that measuring the credit gap using only bank credit does better than using bank and nonbank credit. Using bank credit, the methodology would not call for activating the CCyB in recent years and during the 1998 *sudden stop*. In addition, the bank credit gap tracks more closely the crises of 1982, 1998 and 2008: the overall credit gap rose between 1997 and 2001, while the bank credit gap fell sharply. Moreover, the BCCh found that using real bank credit, instead of bank credit-to-GDP, performs even better in terms of signaling events of financial fragility more precisely. In the 1982 and 2008 crises, the real credit gap rose more and significantly ahead of the credit-to-GDP gap. This is in line with the findings of Mendoza and Terrones (2008, 2012), who found that the real credit gap is a better indicator of credit booms and predictor of crises than the credit-to-GDP gap. They also found that episodes of over-borrowing are identified more accurately when defining credit booms as the 95th percentile of the frequency distribution of the cyclical component of credit.

In light of the above arguments, the Panel recommends that the BCCh utilize Chile's real bank credit gap together with other relevant information and indicators to set the activation and maximum thresholds for the CCyB.

Beyond the formulation of the activation guidance system, the design of the CCyB is challenging in two other key dimensions. First, in the specification of the rule governing the tightening of the capital buffers as the credit gap rises between the activation and maximum thresholds when the CCyB is active (the BIS recommends linear adjustments). Second, in the policy evaluation of the effects of the CCyB (i.e. the quantification of the connections between the CcyB guidance indicator, instruments and targets). The two issues are related, because determining the best way to specify the policy rule for setting the buffers depends on developing a sound quantitative understanding of their macro implications, and in particular aggregate credit and output.

Theoretical work (e.g. Bianchi and Mendoza, 2018; Stein, 2011) finds that the optimal design of macroprudential policy calls for activating the policy when credit conditions are normal at present but the probability of financial distress in the following period is positive, with tighter policy the higher the probability of distress. The policy should be inactive if either the probability of distress is zero or if credit conditions are already in distress. Moreover, quantitative applications (see again Bianchi and Mendoza, 2018) show that the optimal rule is non-linear and complex, and that replacing it with simpler rules, including linear rules relating the policy instrument to the deviation of credit from target, are much less effective than the optimal policy and can even be welfare-reducing. In addition, considering tradeoffs in terms of capital accumulation, sectoral re-allocations, and growth complicates further the analysis. Policy rules aiming to curb credit cause inefficiencies in capital accumulation, sectoral allocations and growth that needed to be traded-off against the benefit of containing over-borrowing. Hence, using a battery of complementary quantitative models to explore these issues is very important for the design of a sound macroprudential policy framework, including the CCyB. This makes it particularly pressing for the BCCh to move forward with the development of the DSGE macro-finance model and complementary non-linear satellite models suggested earlier.

6.3 Analytical Tools and Coordination with Other Financial Regulators

The CMF will need to develop enough expertise to have a good understanding of the interconnections between its macrofinancial policy actions and the targets and instruments of monetary policy that the BCCh focuses on.

Research shows that an environment with separate monetary and macro- financial policies is significantly superior to one in which monetary policy is augmented with financial stability considerations (see Carrillo et al., 2018). These findings follow from a model in the vein of the standard New-Keynesian DSGE models used for managing monetary policy to conduct inflation targeting, introducing financial frictions via the well-known Bernanke-Gertler financial accelerator. There are two inefficiencies in the economy, nominal rigidities and costly state verification in credit markets, so as an implication of Tinbergen's rule, a regime with two policy rules (i.e. two sets of policy objectives and tools) dominates one in which one policy rule is augmented to introduce financial stability goals. Quantitatively, the economy with the two rules exhibits much smoother business cycles, suffers much smaller efficiency losses due to financial frictions, and yields significantly higher welfare. With only one policy rule, monetary policy is too tight (responds too much to inflation movements) and macrofinancial policy is also too tight (it does not respond enough to movements in credit spreads). The same research also shows, however, that a regime with separate policy authorities provides incentives for strategic interaction, which creates the need for coordination of the two authorities. Thus, the separation of monetary and financial policy management envisaged in the Chilean legislation is in line with what this research finds desirable, but the same work highlights the importance of coordination between the two authorities and two policy focuses when both are inside the BCCh.

6.4 Interactions of Monetary Policy and Financial Stability

MPD and FPD are collaborating in a joint venture to develop a new open-economy New-Keynesian DSGE model that introduces financial intermediation and financial frictions. The intent is to have a model bridging the two Divisions to provide a framework that can be used to quantify the effects of financial and monetary policies on the economy as whole, particularly the effects of monetary policies on the financial sector and of financial policies on output and inflation. This model is also expected to play a central role in the hybrid framework for managing the CCyB. Development of this model is at a very early stage and consists mainly of a short document by Calani et al. (2019), which lays down the model blocks and equations and the deterministic stationary state. *This project should be made a high priority given its fundamental importance for providing the BCCh policymaking process with forecasts of policy changes that capture crucial interactions between the real economy, nominal variables, and the financial sector.* This model will also be central for the management of the CCyB and other macroprudential policies, and for the coordination between monetary and financial policies. The model is complex with many tasks still pending. Hence, *work on this project needs an explicit timetable with specific targets for completion followed by an itemized list of dates for stage testing and implementation and initial trials for constructing policy scenarios.*

The design of the macro financial model borrows heavily from the work of Clerc et al. (2015), which was itself a collaboration of staff of various central banks in the European System of Central Banks, the European Central Bank and the Board of Governors of the Federal Reserve System. At their core, these models are extensions of the well-known Bernanke-Gertler-Gilchrist (BGG)-DSGE model (Bernanke et al., 1999), which introduces financial frictions using the classic model of costly state verification of borrowers' outcomes by creditors proposed by Bernanke and Gertler (1989). Hence, as noted earlier, these models feature two main sources of inefficiency: nominal rigidities and costly state verification. The Bernanke-Gertler setup yields an external finance premium that is a convex function of the leverage ratio (i.e. the ratio of the market value of investment to net worth). If investment is small relative to net worth so that internal funds suffice to finance it, there is no premium, but beyond that the premium rises at an increasing rate as investment rises because of the higher likelihood of debtor bankruptcy.

Following Clerc et al. (2015), the BCCh macro financial model incorporates into a large-scale DSGE model a Bernanke-Gertler formulation of financial intermediation with costly state verification at three levels: in the borrowing that firms and impatient households undertake from banks to finance investment and housing, respectively, and in the "borrowing" by banks from patient households from whom they take deposits. This project is very ambitious and very interesting, but at this stage the design of the model lacks a critical piece, which is a complete formulation of the financial policy instruments and reaction function or policy rule governing these instruments. The model includes a regulatory capital constraint on banks, but the BCCh document does not discuss whether it will be used as policy instrument and does not formulate a policy rule to govern it. On the monetary side, the model features a standard Taylor rule without financial variables.

As with the XMAS model, the macro-finance model that the BCCh plans to build is state-of-the-art relative to what is being done in other central banks and international organizations. Questions remain, however, as to whether (a) costly state verification à la BGG is the relevant financial friction to focus on; (b) the use of local approximation solution methods imposes limitations on the extent to which the model can capture financial amplification and crisis dynamics, and their response to policy intervention (in particular macroprudential policy); and (c) the model as envisaged captures all the core elements of the real and financial sides of the Chilean economy.

From the early attempts to use the BGG model to characterize financial amplification and crisis dynamics (e.g. Gertler et al., 2007) it became apparent that the BGG-DSGE representation of the external finance premium does not yield a strong financial amplification mechanism. In general, the incremental contribution of the mechanism to overall volatility of the macro variables or impulse responses to shocks relative to what is obtained without it in the presence of normal shocks is small. Gertler et al. (2007) set aside this problem by examining how the mechanism works when the economy is hit by a large and unanticipated financial shock, in the form of a disaster-like shock to the world real interest rate. More recently, however, Christiano et al. (2014) found that the mechanism can be strengthened significantly by introducing "risk shocks" (i.e. shocks to the variance of the idiosyncratic returns of borrowers). This can be a feature worth considering for the macro financial model of the BCCh, particularly if a richer commodity sector can be introduced in which risk shocks could be entering in the variance of the stochastic process of copper and/or oil prices.

The above discussion assumes that costly state verification is the key financial friction affecting the Chilean economy, it only needs to be tweaked in how is modeled. It could be, however, that in the context of modern financial systems and in Chile's particular situation there are other financial

frictions worth looking into. For example, liability dollarization (intermediation of hard currency inflows into domestic credit) and Fisherian collateral constraints (credit and margin limits associated to the market values of incomes or assets) may be playing important roles.

The use of local methods to solve the macro financial model also merits some consideration. As with the XMAS model, the suggestion is not to refrain from building large-scale models for policy assessment that need to be solved with local methods, but to be aware of their limitations and to develop satellite models that can supplement the input they provide for policy decisions. Ideally, as suggested in Mendoza (2018), one would like to have a macro financial model that is accurate at representing normal-times business cycles as well as infrequent (but positive-probability) transitions to credit booms followed by periods of financial vulnerability and possibly financial crises. This is inherently a question that involves non-linear dynamics which are intractable for the kind of low-order local methods typically used to solve BGG-DSGE models. The theory of the external finance premium does allow for non-linearities, represented by the convexity of the external finance premium, but the local approximation methods used to solve these models implies that excess returns in periods of financial instability are likely to be significantly underestimated if the models are solved locally around normal business-cycle times.

Like the XMAS model, the macro financial model will use a local approximation solution method with a debt-elastic interest rate function to pin down the dynamics of external adjustment and NFA, with the same limitations explained earlier (see Appendix 3 for details). In this context, one example of the kind of issues that this methodology would find hard to tackle is the question of the amount of foreign reserves that could be effective and/or desirable as a buffer stock to reduce the magnitude and frequency of sudden stops. A global solution method can be used to quantify the socially optimal amount of additional reserves to accumulate in the presence of financial frictions and the endogenous risk of Sudden Stops (see Durdu et al., 2009), but with local methods that use the DEIR function the NFA cannot change in the long-run with a first-order local method, or with higher-order methods it would change but by amounts that differ significantly from the ''true" model solution (see De Groot et al., 2019).

The macro financial model should borrow from the XMAS model important features that are relevant for the Chilean economy, particularly the modeling of copper production and the effects of terms of trade working via copper and oil prices. As envisaged in the current plans, the commodity sector is to be modeled simply as an exogenous stochastic endowment that is fully exported at an exogenous world relative price. This allows the model to capture basic income effects of terms-of-trade fluctuations, but disregards the significant connections of the copper sector with the rest of the Chilean economy (some of which are captured in the XMAS model) and also abstracts from the role of terms-of-trade fluctuations in financial transmission in Chile.

As with the existing models for monetary and financial policy, satellite models can also be very helpful in this area. For instance, a parsimonious model with an occasionally binding collateral constraint solved with non-linear global methods can be used to assess the effectiveness of policies like the CCyB or LTV regulation, complementing the assessment from the BGG-DSGE model. These models are also useful for capturing the tradeoffs of macroprudential policies, particularly their potentially adverse effects on capital accumulation: macroprudential policies are desirable because they aim to increase the marginal cost of borrowing faced by private agents in order to align it with the social marginal cost, which is higher in the absence of regulation because of externalities

that are pervasive in credit markets (e.g. pecuniary externalities because private agents do not internalize the effect of individual borrowing choice on the market value of collateral). At the same time, however, arbitrage in rates of return linking capital returns and marginal borrowing costs implies that macroprudential policies also cause a distortion akin to capital income taxes on the marginal benefits of capital accumulation. Hence the benefit of taxing debt for macroprudential reasons has to be traded-off carefully against the cost of inducing efficiency losses in capital accumulation using models that can quantify accurately both parts of this tradeoff. Moreover, when capital of different sectors is valued differently for collateral purposes, these distortions also affect the sectoral allocation of factors of production, and thus the quantitative assessment of the tradeoffs of macroprudential policies also needs to take sectoral misallocation into account.

7. FINANCIAL STABILITY COMMUNICATION

The communication of financial stability issues can be beneficial because it allows households, firms and financial institutions to make better informed decisions and thereby allocate their resources more efficiently. On the other hand, disclosing information about financial fragilities has the potential to endanger financial stability; for instance, revealing liquidity problems of a bank could trigger a bank run. Thus, communications related to financial stability could have positive or negative information effects.[71]

In addition, financial stability communications can have incentive effects as the disclosure of information could lead to a structural change in behavior. For instance, if banks know that they are going to be bailed out if they run into trouble, they may engage in more risky behavior. Thus, a central bank as lender of last resort may use 'constructive ambiguity' to avoid such moral hazard. On the other hand, financial information disclosures could lead to beneficial incentive effects. For instance, if financial institutions know that they are going to be subjected to regular 'stress testing', then they are likely to avoid risky decisions that would endanger passing the stress tests.

Interestingly, the effect of releasing specific information could critically depend on when or how it is done. For instance, revealing the liquidity positions of banks in trouble would be detrimental to financial stability, but announcing well in advance that such information will be regularly disclosed could improve incentives for banks to engage in more prudent conduct. Thus, information disclosures that may be very harmful during times of turmoil, could contribute to financial stability when they are made regularly and are announced in advance. As a result, financial stability communications need to be carefully considered, but commitment to regular releases can have beneficial information and incentive effects.

The BCCh regularly publishes a Financial Stability Report, which is reviewed in Section 7.1. Presentations by Board Members on financial stability are discussed in Section 7.2, and some other communications related to financial stability issues are considered in Section 7.3.

In line with the remit of our evaluation, the main focus in this chapter is on financial stability communications in recent years. Gray (2017) provided a fine review of the BCCh's Financial Stability Report. So, in this evaluation we pay special attention to the way in which the BCCh has implemented these changes, and the experience with the BCCh's new communications regime for monetary policy since 2018.

7.1. Financial Stability Report

The BCCh has published its Financial Stability Report (*Informe de Estabilidad Financiera*) twice a year since 2004. It has been the BCCh's main communication tool with respect to financial stability. The Report analyzes external and domestic macroeconomic and financial developments that are relevant to the stability of Chile's financial system. It covers financial markets and institutions, including banks and non-bank financial intermediaries. In addition, it presents policies and measures that support the normal operation of the internal and external payment system.

[71]/ See Geraats (2010b and 2009) for a further discussion of information and incentive effects of financial stability and monetary policy communications.

The Financial Stability Report used to be published in June and December, at the same time as the Monetary Policy Report. But the analysis and forecasts in the latter generally attracted most of the attention, so the messages and insights from the Financial Stability Report tended to get crowded out. Since 2018, however, the Financial Stability Report has been published in May and November, separately from the Monetary Policy Report, and with its own presentation by the Governor before the Senate Finance Committee and at a press conference. This is a significant improvement that has increased the exposure of the Financial Stability Report, thereby enabling more effective communication of its messages.

The structure and contents of the Financial Stability Report has evolved and matured in recent years. Its length has also steadily increased from around 55 pages in 2014 to around 100 pages for the two most recent Reports.

The Financial Stability Report starts with a one-page Preface and a Summary of two to four pages. Currently, it has the following chapters:

I. Financial Market Trends and External Events: This reviews international and local financial developments, followed by a discussion of risk factors for financial stability.

II. Credit Users: This chapter analyzes financial developments for firms, the real estate sector, households, and central government.

III. Lenders: This chapter covers the banking sector, including risk factors to the banking system and stress tests performed by the BCCh, as well as non-bank lenders.

IV. Special Topic: This is thematic chapter on a topic related to financial stability, which was introduced in the 2017H2 Report.

V. Financial Regulation: This chapter reviews the main domestic and international developments in financial regulation.

VI. Payment Systems: This chapter, which is only included in Reports for the second half of the year, describes developments in the payments system, including large-value payments systems, financial infrastructure, and retail payments systems.

In addition, several Boxes are included in the Report that provide more detail on topics or issues that are relevant for financial stability. The Boxes are generally quite informative, although many are largely descriptive and not very analytical. Sometimes that is inherent in the topic (e.g. the new Genenal Banking Law), but often a topic could have been covered more analytically. Boxes that delve into the topic in an analytical way tend to yield valuable insights. For instance, the Box on the *"Evolution of Household Debt in the Household Finance Survey"* could have been mostly descriptive, but instead Box II.1 on this topic in the 2018H2 Financial Stability Report investigated the issues more closely and provided useful decompositions to reach insightful conclusions. So, *the Panel recommends that the Financial Stability Report includes more analytical Boxes.*

Financial stability is a multifaceted concept that could be interpreted in several ways. In principle, it involves a well-functioning financial system that is resilient to shocks, with healthy financial

institutions and with financial markets in which asset prices are consistent with fundamentals. Thus, it has macro, micro and asset pricing aspects.

The BCCh's focus in this respect has long been communicated in the Preface of the Financial Stability Report, and since 2018 its interpretation of financial stability has been added:

> *"The Central Bank's focus in the area of financial stability is centered mainly on the well-functioning of the system and the Chilean economy's access to international financial markets. In this context, financial stability is said to exist when the financial system is able to operate normally or without significant disruptions, even in the face of adverse situations." (p. 5)*

The BCCh's focus can be directly related to its objective to ensure "the normal functioning of the internal and external payment systems", as stipulated in its Basic Constitutional Act (LOC, Section 3). The BCCh's interpretation could arguably be read to include the macro, micro and asset pricing aspects of financial stability. Nevertheless, it would be desirable to clarify it.

The Summary section of the Financial Stability Report provides an overview of financial developments and it issues some—sometimes understated—warnings to the private sector,[72] or suggestions to other authorities.[73] The first paragraph of the Summary provides a useful digest. In addition, the leading sentence of the other paragraphs and sometimes a few other key sentences are in boldface, making it easier to identify the key points.

Nevertheless, it would be desirable to develop a systematic way to evaluate and concisely communicate various financial stability risks. It would be useful to assess them in two respects, likelihood and impact, which together determine risk. Graphic and symbolic representations could be used to concisely convey them and summarize the degree of financial resilience or vulnerability.[74] This will be important once the BCCh's new financial policy tool has been introduced, the countercyclical capital buffer. Since the decision on the latter can be easily summarized (in a single number, the size of the buffer), there is a significant risk it will crowd out the BCCh's other financial stability messages and warnings, which are more challenging to communicate.

The Financial Stability Report used to start with a chapter on the *External Environment and Financial Risks,* followed by a chapter on *Local Financial Markets.* But in line with the recommendation made in the Gray (2017) review, these two chapters have been merged, with separate sections on the international and local financial situation. The focus is on financial volatility and risks. A useful heat map of vulnerabilities in international asset valuation has been added in 2018, based on corporate and high-yield bond spreads and price-earnings ratio of equities in the United States and Europe. In addition, much attention is paid to volatility and other risks in emerging markets. But domestic asset prices are no longer covered so well (there used to be a separate section on this). It would

[72]/ For instance, *"In summary, the current financial situation of firms and households is somewhat less adequate than it was in previous years, so their capacity to deal with a deterioration in the domestic and international macroeconomic environment has dwindled. Thus, it is necessary for agents to properly evaluate their borrowing and lending decisions."* (Financial Stability Report 2014H2, p. 8).

[73]/ For instance, *"In an international context, the banking system's CAR [Capital Adequacy Ratio] remains below the 25th percentile with respect to OECD countries and within the region. Accordingly, it is important to carry out legislative initiatives that help strengthening bank capitalization, in line with the efforts that other countries have made in order to meet the Basel requirements."* (Financial Stability Report 2016H2, p. 9).

[74]/ For instance, likelihood and impact could be displayed in a graph, while color coding (e.g. green, yellow, orange and red) could be used to indicate financial stability risks.

be useful for the BCCh to also develop a heat map of vulnerabilities in asset price valuation and volatility in emerging markets, including separate rows for Chile.

The title of the first chapter now includes "financial market trends", which suggests it takes a broader view of developments and is not just backward-looking. But there is currently little focus on identifying trends and there is only limited forward-looking analysis in the chapter. For instance, the May 2019 Financial Stability Report just considers the growth outlook for the world and the probability of a rate hike in June 2019 in the eurozone and the United States (Figure I.1). It would be useful to discuss the outlook for key foreign policy rates over a horizon of at least six months, covering the period until the next Financial Stability Report. For example, the 2016H2 Financial Stability Report (Figure I.3) showed the (change in) probability of rate hikes by the Fed for the year ahead (compared to the previous Report).

The final section of chapter I discusses the threats or risk factors for financial stability. Following the merger of the chapters, the Report should clearly distinguish between external and domestic risks/threats to financial stability, including potential bubbles in local asset prices. This is important because external risks are outside its control, whereas domestic threats to financial stability could be addressed through financial policies by the BCCh or CMF.

All in all, although some useful improvements have been made to chapter I (such as the heat map for international asset valuation vulnerabilities), the BCCh would benefit from extending these (such as a heat map for emerging markets, including Chile) and focus more on the short run outlook (covering at least six months, until the next Report). In addition, the current title of chapter I, *"Financial Market Trends and External Events"*, does not capture its contents well. It would be more appropriate to label it *"External and Financial Market Developments"*.

Chapter II on *"Credit Users"* analyzes the levels and sources of financing for firms, developments in the real estate sector, including house prices and loan-to-value ratios, the levels, types and affordability of household debt, and briefly, the level of central government debt. Regarding household debt, it would be useful to more systematically show indicators of indebtedness and affordability (such as debt-to-income and debt service ratios), as well as delinquency indicators (such as arrears and default rates), because they provide important information about financial risks and vulnerabilities.

Chapter III, which was relabeled from *"Banking System"* to *"Lenders"* in 2018, mostly focuses on the banking sector, although it now also explicitly considers nonbank lenders. In the last two Financial Stability Reports, this chapter has had four separate sections: *Banking Sector, Risk Factors, Stress Tests,* and *Nonbank Lenders. In the Banking Sector* section, it would be useful to more systematically show indicators of profitability, solvency and liquidity of banks (such as return on equity, capital adequacy ratio and liquidity coverage ratio), as well as credit risk indicators (such as arrears and write-offs), because they provide important information about the resilience and susceptibility of banks to financial risks. It would also be desirable to have an overall measure of the latter. The most recent Financial Stability Report (2019H1) included a bank fragility index based on loans, non-performing loans and return on assets (Figure III.1), which could be very useful in this respect.

The section on *Risk Factors* currently only covers the banking sector, and the discussion of risks in the *Nonbank Lenders* section is limited and rather opaque, without explicit conclusions. It would be useful to have a more comprehensive section on risk factors in chapter III that covers both banks and nonbank lenders, and to then include it at the end of the chapter.

The most interesting part of chapter III is the section on *Stress Tests,* which has long been a key feature of the Financial Stability Report. It presents the results of stress tests carried out by the BCCh based on macro-financial and accounting data from banks. It shows system-wide results as well as the distribution across banks, but without disclosing results for individual banks. For instance, the impact of the stress tests on the return on equity (ROE) and capital adequacy ratio (CAR) is shown in box-whisker diagrams, including the minimum and maximum levels across banks, the 25th-75th percentiles, and the median and system-wide levels.

Since the 2017H2 Report, the stress tests are conducted for two scenarios: a "severe" stress scenario with a sharp contraction of GDP followed by a recovery in line with previous crises, and now also an "adverse" scenario with persistent weak growth (see Section 6.1 for further details and a discussion of the BCCh's stress testing framework for banks). The path for GDP growth under each scenario is plotted in a graph that goes back to the mid-1990s (e.g. in Figure III.11 in the 2019H1 Report), which facilitates a comparison to previous stress episodes.

The stress tests are conducted for a window that appears to be around two years (e.g. roughly spanning 2019 and 2020 in Figure III.11 of the 2019H1 Report), but the exact window is not specified in the Report. The results are reported for the current half year and compared to those presented in the previous (one to four) Report(s), occasionally going back to results from 2011. But the table and graphs in which the stress test results are presented do not always make clear that these are comparisons to results from previous Reports.[75] In addition, the current and previous results for the two stress scenarios (or risk categories) are shown next to each other without a clear break in the table or horizontal axis of the graph, making them harder to read. Furthermore, only showing the effects for the current half year is not very useful for the 'adverse' scenario of a weak but persistent slowdown, because the sting of this scenario is in the tail, when GDP growth drops below that in the 'severe' scenario.

The methodology used for some part of the stress tests is occasionally described in a Box in the Report,[76] but generally there is just a terse footnote at the start of the Stress Tests section that refers to a reference (in Spanish) and a previous Financial Stability Report, which in turn mentions two other references. So, it is challenging to find out exactly what methodology has been used, which complicates the interpretation of the results. It would be desirable for the BCCh to provide transparency in this respect by publishing a single document describing the framework, methodology and assumptions used for its stress tests (also in English).

All in all, the stress tests reported in the Financial Stability Report provide valuable insights, but their design and presentation could be further improved. In principle, it could be useful to publish the stress test results for individual banks as well, provided sufficient advance notice is provided to enable beneficial incentive effects. However, the BCCh's stress tests do not incorporate detailed information that is available to the banking supervisor (which has recently become part of the

[75]/ For instance, in the 2019H1 Report this is not specified in Table III.3 and Figures III.12, III.13, III.14, III.15 and III.17, with Figure III.16 being an exception.

[76]/ For instance, Box III.2 *"Decomposition of Credit Risk in Bank Stress Tests"* in the 2018H2 Financial Stability Report.

CMF), so they may give a misleading impression. As a result, it is vital for the BCCh to cooperate with the banking supervisor to ensure that its stress tests make use of all available information to improve their reliability. And any decision to publish individual stress test results should also only be made in close coordination with the banking regulator.

Chapter IV of the Financial Stability Report is a thematic chapter. So far, the topics have been *"Financial Cycles and Macroprudential Policy"* (2017H2), *"Technological Innovations and Financial Stability"* (2018H1), *"Residential Real Estate Sector and Financial Stability"* (2018H2) and *"Analysis of Household Vulnerabilities and Financial Risks"* (2019H1). The latter provides high quality analysis and yields useful results; the Financial Stability Report should continue to provide such an analytical thematic chapter on other topics as well.

The chapter in the 2019H1 Report presents a comprehensive analysis of changes in the financial situation of Chilean households over the last decade, focusing on their indebtedness. It is based on the *Household Finance Survey* (HFS), which was conducted in 2007, 2011, 2014 and 2017, complemented by administrative and accounting records (including a bank debtor registry). This data is used to conduct stress tests on household debt to estimate the effects on default rates and levels of debt at risk of default under (up to five) stress scenarios in the labor, real estate and credit markets. Results are also shown by type of debt and income stratum. In addition, stress tests are performed on the debt at risk for owners of a second home under three stress scenarios, shown by income stratum. The analysis is very rich, although the stress scenario for the labor market could have been better designed. In addition to an increase in the unemployment rate of up to 4 percentage points, it considers shocks to income and job quality for (self-)employed workers, but these assume the worst value during 2010-2017, which excludes the recession in 2009. Instead, the stressed labor market scenario should have been based on the latter or otherwise designed to capture the highly detrimental effects of a recession, which would have made the results of the stress tests more useful.

Chapter V of the Financial Stability Report on *"Financial Regulation"* reviews the main developments in Chile and abroad, including regulation issued by the BCCh and other domestic financial authorities. The 2019H1 Report also set out the BCCh's regulatory agenda. At the end of chapter V is a useful summary overview (Tables V.1 and V.2) of the main financial regulations that have been issued or were published for public consultation during the last six months, including a brief description. In addition, there is a *"List of Documents Reviewed"* (Table V.3), but its purpose is not clear, and it is not mentioned anywhere in the text. Although chapter V is mostly descriptive, it is very informative and sometimes includes a Box with valuable insights, such as Box V.1 in the 2018H1 Report (pp. 71-73), which identifies gaps in Chile's new financial regulatory framework.

Chapter VI on the *Payments System* pertains most directly to the BCCh's constitutional mandate to safeguard the normal functioning of the internal and external payment systems. This chapter contains three sections: *Large-Value Payments Systems, Financial Infrastructure,* and *Retail Payments Systems*. Regarding the first, the BCCh manages Chile's Real-Time Gross Settlements (RTGS) system (*"Sistema de Liquidación Bruta en Tiempo Real"*, LBTR) and has set two main objectives for it in terms of operational security: maintaining operational continuity of at least 99.8%; and resuming operations within two hours of a service disruption. The 2018H2 Financial Stability Report stated that it had managed to maintain 100% operational availability for four consecutive years (p. 72), although it dipped to 99.96% for 2018, still exceeding its goals. The sections on *Large-Value*

Payments Systems and *Retail Payments Systems* include further useful statistics related to payments, while the *Financial Infrastructure* section provides a description of recent regulatory developments.

At the end of the Financial Stability Report is a list of abbreviations and an extensive, useful glossary, although Chile's Financial Market Commission (CMF) and Financial Stability Council are not included in the latter, and occasionally the definition of a term is a bit odd.[77]

The Financial Stability Report is mostly well-written, but sometimes its readability suffers from some glitches. For instance, text (including labels and notes of tables and graphs) is not always (fully) translated into English.[78] Tables or graphs sometimes provide too little information to interpret what is shown.[79] The Report routinely refers to the "figure set" or "statistical appendix" without stating where to find them. It turns out that they are available in Excel files on the Financial Stability Report web page, but in Spanish only. In addition, it is very cumbersome to find which graph in the *'Anexo Estadístico'* file corresponds to a specific 'statistical appendix' reference in the Report as the latter does not specify the graph number.

The readability of the Report could also be improved by modifying the layout to ensure that tables and figures are included on the same page as the text that refers to them. In addition, in Boxes they are sometimes placed seemingly randomly in the middle of the text, even in the middle of a paragraph that does not refer to them, which disrupts the flow of the text and forces the reader to jump across columns (or even pages) to find the table or figure that has been referred to.[80] Instead, it would be desirable to put tables and figures next to or immediately after the paragraph that refers to them, so that their positioning is less disruptive. For tables it would also be helpful to always show the numbers for broader categories in bold, just like their labels, to make them easier to read (e.g. in Table II.1 in the 2019H1 Financial Stability Report).

Overall, the BCCh's Financial Stability Report is of high quality. In fact, it ranked first in an extensive IMF review of Financial Stability Reports from Latin America and the Caribbean (Lim et al., 2017),[81] with a score of 3 out of 4, which is similar to the average for advanced economies (in 2010). Nevertheless, the BCCh got low scores (2 out of 4) for several criteria. Although some steps have been taken that address these, there continues to be scope for considerable improvements in the BCCh's definition of financial stability, a clear identification of the main financial stability issues, the explanation of the methodology, and a synthesis of findings from different sectors.

Furthermore, the Financial Stability Report should be more forward-looking. It would be useful to have a section on *Outlook and Risks* at the end of chapters I, II, III and VI, including an assessment of the relative importance of various financial stability risks. It should discuss the outlook related to external and domestic financial developments for a horizon of at least six months, so that the period until the next Report is covered. Expectations derived from financial asset prices could be used in this respect (e.g. expectations of future interest rates from interest rate swaps and default probabilities from credit default swap (CDS) spreads).

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[77]/ For example, *"Yield curve: The ratio of the yield or return of fixed-income securities to their maturity."* (Financial Stability Report 2019H1, p. 92).

[78]/ For instance, parts of Tables I.2, II.3 and IV.1 in the 2019H1 Financial Stability Report, and the entire list of abbreviations at its end were not translated.

[79]/ For example, the table and figures mentioned in footnote F6. Also, Figure II.5 on foreign corporate debt in the 2019H1 Report does not clarify that "Reporting" ("Non-reporting") refers to firms (not) reporting to the Financial Market Commission (CMF).

[80]/ For instance, see the positioning of the Tables and Figures on pp. 28-29 in Box II.1 of the Financial Stability Report for 2018H2.

[81]/ The review evaluated the quality of Financial Stability Reports on the basis of 26 criteria covering five aspects: clarity of aims; overall assessment; coverage of issues; data, assumptions, and tools; and structure and other features.

So, the Panel recommends that the Financial Stability Report should be more forward-looking and more clearly convey financial stability vulnerabilities and risks.

7.2 Presentations by Board Members

Shortly after publication of the Financial Stability Report on the BCCh website, it is presented to the Senate Finance Committee (in line with Section 4 of the BCCh's LOC) by the Governor, who is joined by the other Board Members. This testimony is broadcast live on the Senate TV channel and website (tv.senado.cl), and the presentation (excluding Q&A) is posted on the BCCh website (in Spanish only).

Subsequently, the Governor gives a more accessible presentation of the Report at a press conference (in Spanish), joined by the Head of the Financial Policy Division. The key points are conveyed using short messages and attractive, supporting illustrations. The press conference is webcast, but the presentation, slides and Q&A are not posted on the BCCh website.

Since 2018, the Governor has also presented the Report in much greater detail the next day to the senior officials of Chilean financial institutions at a seminar organized by the Association of Banks and Financial Institutions (*Asociación de Bancos e Instituciones Financieras,* ABIF). It is great that the BCCh's financial stability messages and warnings are now directly communicated to them in this way, but it would be desirable for this interaction to be webcast.

Occasionally, there are other presentations. For instance, the Governor presented the results of the 2017 Household Finance Survey (*"Encuesta Financiera de Hogares"*) in a very accessible way on 12 September 2018.

7.3 Other Communications

The redesign of the *Annual Report* in 2018 has led to a separate chapter on "*Financial Policy*", including useful information about the mandate and performance. Related to financial stability, the BCCh provides exemplary transparency on the level and composition of its foreign exchange reserves, including a detailed appendix on international reserve management in the *Annual Report* and September Monetary Policy Report.

To safeguard the normal operation of internal and external payments and financial stability more generally, the BCCh has a range of legal powers, such as extending emergency credit in its role of lender of last resort to the banking system, and determining regulations pertaining to the financial system and foreign exchange operations. The latter are all communicated through the BCCh's official website.

The Financial Policy section on the BCCh website in English is very limited and contains only two subsections: Financial Stability Report, and *Compendium of Foreign Exchange Regulations.* The latter literally does not contain any information. The former provides a brief general description of the contents of the Financial Stability Report, and a link to the pdf of the latest Report. The Spanish Financial Policy Report web pages have much more information (since 2015), including

a list with links to the Boxes in the Report; a list of Excel files containing all tables and graphs in the Report (by chapter and Box) and a statistical appendix (*'Anexo Estadístico'*) with further graphs; and sometimes useful supplementary documents (*"Documentos Anexos"*), including some of the unpublished papers by BCCh staff cited in the Report ('*Minutas Citadas*') and (since 2018) an illustrated summary ('*resumen ilustrado*'). The latter is a shortened, modified version of the Summary in the Report that includes a table summarizing the main risks, channels, vulnerabilities and mitigating factors. The Financial Policy Report web page, however, generally does not provide any links to the Governor's presentations (statements or webcasts) of the Report at the press conference and before the Senate. Again, it is very hard to find any link on the BCCh website to their webcasts.

The Financial Policy section on the Spanish BCCh website is also much more extensive, including links to helpful lists of all the Boxes and articles in the Financial Stability Reports. In addition, it has subsections that provide compendiums of financial and exchange rate standards and regulations. It also has an elaborate subsection on the payment system, which is very informative. But there is no other information on the BCCh's financial policy.

The Panel recommends that the BCCh significantly extends the Financial Policy section of its website, especially in English, by including a page with a description of its definition of financial stability and financial policy framework, and adding links on the Financial Stability Report web pages to the statements and webcasts of the Governor's presentation before the Senate and at the press conference.

The BCCh also uses Twitter for financial stability communications. For instance, for the 2019H1 Financial Stability Report, it succeeded in getting across the main messages of the Report in just eight tweets, each using a single sentence combined with an attractive, colorful illustration supporting the message (based on the press conference slides). It is an excellent example of the effective use of social media to reach a wider audience.

In addition, the BCCh has a dedicated online platform for its economic and financial education initiatives, called "*Central to Your Life*" (*Central en tu Vida*) at www.centralentuvida.cl. In 2018 it launched a free online training course "*La Ciudad de las Oportunidades*" (*City of Opportunities*) for high school teachers, developed together with the Milenio Institute (MIPP) at the University of Chile. It equips teachers to provide economics and financial education in an appealing way, covering basic economic concepts, personal finance, money and the banking system, and the role of the Central Bank. Nearly 300 teachers completed the course and it is running again this year. This is a very effective way of improving the financial education of thousands of students. By helping people make better financial decisions, the BCCh contributes to enhancing their economic wellbeing and promoting financial stability.

The BCCh also participates in the annual *Global Money Week,* which aims to raise financial awareness among children and young people. The BCCh's efforts in promoting financial education and inclusion in Chile were recognized at the Global Inclusion Awards 2018, where it won the *Child*

and Youth Finance International (CYFI) Country Award for the Americas and Caribbean. So, both in terms of its Financial Stability Report and its financial education outreach efforts, the BCCh ranks first among its Latin American peers.

8. RESOURCES AND ORGANIZATION

At present, MPD counts 26 PhD economists, while FPD has 19 PhD economists. Hence, 45 PhD economists are currently at work on the high-skill tasks allocated to the monetary policy and financial stability functions of the BCCh. This relatively small staff is highly productive considering the high quality and quantity of their output and the strong performance record of the BCCh. Still, present and future work demands imply that additional PhD-level staff positions are needed in MPD and in FPD. In this regard, plans to add four new positions in FPD and two-to-three in MPD in the near future are a very welcome development.

The need to add positions in MPD was noted in the 2018 IMF's *Evaluation of the Central Bank of Chile Forecasting and Policy Analysis System (FPAS) for Inflation-Forecast Targeting*. This IMF report noted that: *"While the relatively small staff, limited turnover, and compressed schedule may enhance efficiency, these features also imply costs and risks: the BCCh does not derive full return from its investment in the core models, the FPAS is subject to operational risk… There is little capacity in the system to cope with extra policymaker demands or unexpected staff absences. The lack of redundancy means that while resources are adequate to produce a model-based baseline forecast, they are insufficient for well-adapted model-based alternative scenarios within the allotted time schedule"* (p. 21). *"Increased rotation between forecast production, on the one hand, and model development or special projects, on the other, would also reduce operational risks. It would widen staff skill-sets and reduce the risk of staff burnout"* (p.11). The report called for a *"modest increase in forecast team staff, to allow a couple of economists to focus on a few model-based risk scenarios, relevant to the present conjuncture, but substantially different from the baseline"* (p. 27). Keep in mind also that this IMF evaluation focused only on the inflation targeting framework of the MPD, it did not include an evaluation of the financial stability work in the FPD, and did not take into account the implementation of the CCyB model infrastructure and the development of the new framework introducing financial transmission and financial stability considerations into the inflation targeting analysis.

It is also worth noting that the PhD-level staff is significantly smaller than at some peer institutions in Latin America. For instance, the Bank of Mexico (*Banco de México*) has 65 PhD economists in the two groups that have the same functions as FPD and MPD at the BCCh, not counting vacancies. There may be reasons to justify a somewhat larger staff at the Bank of Mexico, but the main functions of the monetary policy and financial stability groups are similar, and hence a difference of nearly 45 percent is indicative of the need to enlarge the PhD-level staff of MPD and FPD at the BCCh. Specific tasks in which additional staff is needed were evident in conversations with both MPD and FPD, for instance in preparations to deploy the CCyB and to be ready to fulfill this and the other functions of the BCCh under the new regulatory environment on time by the announced deadline. FPD is in particular need of building up additional expertise in macro-finance modeling. The proposed 4-6 PhD staff positions will contribute to remedy this situation, but taking

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APPENDICES

Appendix 1:
Terms of Reference of Evaluation

Background

Reference is made to an independent external evaluation undertaking by the Central Bank of Chile (hereafter, the Bank) on the fulfilment of its mandatory objectives as enshrined in its Basic Constitutional Act (BCA) of 1989. These include price stability and financial stability (hereafter, the Evaluation).

The BCA has granted the Bank autonomy to achieve its legal purpose and to exercise its powers, regarding other entities of the State. The Evaluation will assess the extent to which the Bank has accomplished its two institutional objectives and will be submitted to the Government and the Senate as a voluntary accountability exercise on the occasion of the 30th anniversary of the BCA.

The Evaluation will be undertaken by a Panel of five independent external experts (evaluators), one of them acting as Chairperson (hereafter, the Panel).

The Bank will appoint a counterparty team to provide the Panel with (i) the terms of reference of the Evaluation as agreed upon by the Board of the Bank; (ii) a number of recent assessments of specific aspects of monetary and financial policy by external consultants/bodies; (iii) all the additional information requested by the Panel, and (iv) logistical support to the planning and development of the Evaluation.

Objectives of the Evaluation

The Panel will assess to which extent the Bank has accomplished its mandatory objectives established in 1989, focusing on the last decade and especially recent years. In particular, the evaluators are asked to consider:

I. The degree of independence of the Bank with respect to other State-run entities in achieving its objectives;

II. The influence and impact of the Bank's policy actions on economic agents and general public decisions;

III. The suitability of the policy framework and tools adopted by the Bank to achieve its monetary policy goal;

IV. The suitability of the policy framework and tools adopted by the Bank to achieve its financial stability goals;

V. The effectiveness of its organization, procedures, and tools to implement such policy frameworks;

VI. The quality of the main policy reports published by the Bank to communicate the framework, analysis and policy decisions in both areas, namely the Monetary Policy Report and the Financial Stability Report, as well as all other formal communication tools (Monetary Policy Statements, minutes, and the like);

VII. The room for potential improvement in any of the above areas.

Appendix 2:
Brief Summary of Main Findings of Recent BCCh Evaluations

"Evaluation of the Central Bank of Chile forecasting and Policy Analysis System for Inflation-Forecasting targeting", conducted in 2013 by an IMF team headed by Douglas Laxton.

Retain the strength of the current system—appropriately designed models, full-integration of model-based forecast in the monetary policy decision making process; streamlined and efficient forecast production, and autonomy of staff in producing the baseline forecast and risk assessment. The report recommends periodic review of medium-term policy performance and policy framework.

"Evaluation of the Central Bank of Chile's Financial Stability Report", conducted by Dale Gray of the IMF in June 2017.

The Central Bank of Chile produces an excellent Financial Stability Report. It was ranked first in an IMF review of Financial Stability Reports from Latin America and the Caribbean. The main comment is that it has too much emphasis on the recent state of the financial system and too little emphasis on risks going forward. Similar comment was made by an IMF team.

Other comments: Create a chapter on special topics, with sufficient lead time for preparation; separate the release time of the Financial Stability Report from the publication of the Monetary Policy Report and enhance its communication to the public.

"Central Bank of Chile's Monetary Policy Decision-making Process, Communication and Transparency, Review and Recommendations", conducted by Carl Andreas Claussen, in December 2017.

The (new) system of monetary-policy decision making process and communication is well in line with practice at leading inflation targeting central banks. The changes announced for 2018 are well chosen and generally well received. Main recommendation: publish a policy rate path behind the BCCh's forecast. However, before that, the Board needs to decide how it wants to do policy analysis and decision making. This is required so as to make the best choices for communication and transparency.

Appendix 3:
Inducing Stationarity in the XMAS Model

Dealing with incomplete financial markets in DSGE models poses a challenging technical tradeoff. On one hand, the models are solved with local approximation methods because they are typically large, multi-sector models with a rich sectoral structure, nominal rigidities, a monetary policy rule, a fiscal sector and in some instances financial intermediation with frictions. On the other hand, because these are models with incomplete markets, the use of local methods requires imposing an exogenous deterministic stationary state for net foreign assets (NFA), otherwise the NFA position diverges to infinity (i.e. NFA dynamics follow a unit-root process).

Inducing stationarity is necessary when solving DSGE models with incomplete markets using local methods, because the standard assumption that the world real interest rate equals the rate of time

preference leads economic agents to accumulate an infinitely large buffer stock of savings at that interest rate. Agents do this because they desire nearly-perfectly smooth consumption while at the same time their income always fluctuates with the shocks hitting the economy and non-state-contingent financial assets cannot provide full insurance against these shocks. Theoretically, this implies that the equilibrium world real interest rate must be lower than the rate of time preference (otherwise a country or set of countries would need to have infinitely negative NFA for others to have the opposite, which is not feasible). But solving DSGE models with this feature and capturing the dynamics of NFA driven by precautionary savings requires global methods, which are not suitable for solving and estimating large-scale DSGE models due to the curse of dimensionality (i.e. the large number of state variables make it computationally impossible to use the global methods).

Following the work of Schmitt-Grohé and Uribe (2003), a widely-used approach to induce stationarity in DSGE models (including XMAS) works by introducing a debt-elastic interest rate (DEIR) function that makes the world real interest rate faced by a small open economy decrease with the deviation of the NFA-GDP ratio relative to its exogenously set long-run target. First-order-approximation local methods yield this target level as the long-run average of the DSGE model solution because they feature certainty equivalence. This implies that the model solutions cannot be used to quantify the effects of shocks or policy changes on long-run external adjustment, because the NFA position always returns to the target level set exogenously. In contrast, theory predicts that under incomplete markets even temporary shocks have permanent effects, and thus changing policy variables or the volatility of shocks changes the time-series properties, including averages, of macro-aggregates, particularly NFA. Higher-order approximations yield long-run averages higher than the ad hoc NFA target, but research suggests they are still quite inaccurate at capturing the long-run dynamics of NFA driven by precautionary savings mechanisms (see Durdu et al., 2019).

Appendix 4:
The Legal Principle of Transparency

According to Section 65 bis of the Act (added in 2008), the BCCh "is governed by the principle of transparency in the exercise of public functions."[82] This principle, which is enshrined in Article 8 (second paragraph) of Chile's Constitution, states that the "acts and resolutions", as well as "their fundamentals and the procedures used", are public, except for some limited, legal exceptions. In addition, the above-mentioned Law on Transparency specifies that the principle of transparency consists in the publicity of "acts, resolutions, procedures and documents, as well as their foundations, and in facilitating the access to that information by any person" (Article 4).

Furthermore, Section 65 bis of the Act specifies the extent to which the disclosure and access to information of the BCCh is subject to the rules of the Law on Transparency. It implies that the following information is public (in line with Title II of the Law):

- BCCh acts and resolutions, and their foundations,
- BCCh documents that serve as their basis or that are their direct and essential supplements,

[82]/ The first paragraph of Section 65 bis states: "The Central Bank is governed by the principle of transparency in the exercise of public functions as enshrined in Article 8 second paragraph of the Political Constitution of the Republic and in Articles 3 and 4 of the Law on Transparency of the Public Service and Access to Information on State Administration."

- BCCh procedures used for their issuance,
- Information prepared with the BCCh budget.

The Law on Transparency distinguishes two principles:

- 'Active Transparency' (Title III) refers to the BCCh's obligation to publish on its website certain information about its main activities, budgets and policies, so that the public can know what it is doing.
- 'Passive Transparency' (Title IV) refers to the right of any person to request and obtain information from the BCCh. It pertains to all acts and documents that are public under the Law on Transparency, except for applicable legal exceptions.

The exceptions apply when its publicity, communication or knowledge affects the due fulfillment of the BCCh's functions, the national interest (including economic or commercial interests of the country), national security, or people's rights. In addition, Section 66 of the BCCh's LOC specifies information that the Bank shall maintain in reserve, except when requested by competent authorities (such as SBIF or Financial Stability Council).

The 'passive transparency' requirement is similar to Freedom of Information Acts in other countries. Overall, the 'principle of transparency' is wide-ranging and applies not only to the BCCh's policy decisions, but also to their foundations and supporting documents, although exceptions exist to ensure the achievement of the BCCh's objectives is not endangered.

Appendix 5:
A Closer Look at BCCh Dissenting Votes

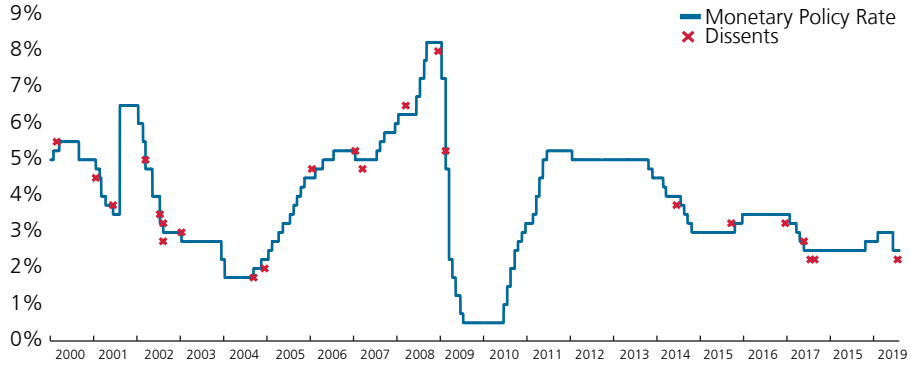
The BCCh Board has made its monetary policy decisions by unanimity at around 90% of its meetings since 2000 (the first calendar year with full-fledged inflation targeting). This is an unusually high rate of unanimity for monetary policy decisions. Naudon and Perez (2017) found that the BCCh has had by far the greatest degree of unanimity compared to five other central banks with inflation targeting (Czech Republic, Iceland, Israel, Sweden and United Kingdom), using a sample period starting in 2007. But the BCCh's 93.5% unanimity rate for that period is distorted by an unusual five-year long span of unanimous monetary policy decisions, from March 2009 until May 2014. Looking at a larger, more diverse sample of eight central banks (Brazil, Czech Republic, Japan, Hungary, Philippines, Sweden, United Kingdom and United States) and an earlier sample period (from the 1990s or early 2000s until mid-2007), Geraats, Giavazzi and Wyplosz (2008) found that the average degree of unanimity across central banks is 60.5%, with the highest being 85% (for the Philippines). The latter is very close to the 86.5% unanimity rate for the BCCh from 2000 until mid-2007. In addition, it was around 80% during the early years of full-fledged inflation targeting, from 2000 until the start of 2003. The pattern of dissents is illustrated in Figure 13, which shows the monetary policy rate and the level that any dissenting Board Member(s) voted for. During the early 2000s, BCCh dissents tended to be 'hawkish' (favoring no or a smaller rate cut) and nearly all involved 3-2 splits, indicating closely contested policy rate decisions. At one meeting the five BCCh Board Members even voted in favor of three different policy options![83]

[83]/ On 8 August 2002, two Board Members voted to hold the policy rate, two voted to reduce it by 50 basis points, and the Governor (who holds the casting vote) voted to reduce it by 25 basis points, which became the decision.

Overall, out of the 22 MPMs with dissent in the BCCh Board since 2000, nearly one-third (7) involved more than one dissenting Board Member. In recent years, dissenting votes have tended to be 'dovish' (favoring a rate cut), roughly balancing the 'hawkish' dissents during the early 2000s. Many dissents (9) were inertial in the sense that they favored the status quo (6) or a smaller policy adjustment (3), with the former all being followed by no further policy rate adjustment for at least one meeting. But most dissents (13) were against a decision to hold the policy rate constant, and in around two-thirds of these, there was a policy rate adjustment in the direction of the dissent within three meetings. So, dissenting votes by BCCh Board members against no-change decisions have been a leading indicator of upcoming policy adjustments.

Figure 13.

Monetary Policy Rate and Dissenting Votes.



Note: The monetary policy rate was defined in terms of UF until 8-8-2001. Sample: 1-1-2000 – 31-7-2019. Source: BCCh and monetary policy meeting minutes.

Appendix 6:
Further Detailed Comments on the Monetary Policy Report

This appendix provides further detailed comments on the contents of the Monetary Policy Report (section a) and its write-up and presentation (section b).

(a) Contents

The Monetary Policy Report includes numerous graphs that illustrate the developments mentioned in the main text. The specific graphs that are shown tend to vary a lot across Reports, depending on contemporaneous developments. Such a flexible approach is useful, because the selection of graphs is informative about developments and variables that the Bank currently considers to be of interest. In contrast, the tables shown in the chapters tend to be the same across Reports (except for those in Boxes on topical issues).

Chapter I ('International Scenario') features a table showing the growth forecasts for the world, major economies, and a few other relevant groups, for the current and next two calendar years. Developments in China are often considered in greater detail, which reflects the fact that it is Chile's most important trading partner and the destination for more than a quarter of Chile's exports.

Given the (strange) title of chapter I, it would definitely be expected to discuss the international baseline scenario assumptions that are shown in a table in the Summary section, but chapter I typically only touches upon them, comparing the forecasts to the previous Report, rather than going into the profile of the forecasts for the current and next two calendar years shown in the international baseline scenario assumptions table. The latter is only done in the Summary section, if at all.

Chapter II on *Financial Conditions* has a table showing the change in the USD exchange rate for a wide range of countries (including Chile) since each of the previous four Monetary Policy Reports. Although the discussion in the Monetary Policy Report frequently makes a comparison with the previous Report, and the 12-month change in the nominal exchange rate is useful for understanding annual inflation, it is not clear what the purpose is of showing the change for the other (middle) two Reports, especially for such a large number of countries. In fact, this table is barely discussed in the main text (except for the peso-dollar exchange rate), so its inclusion should be reviewed.

Until September 2018, chapter III on *Output and Demand* used to include two tables: a table of GDP growth in the previous six quarters, including a detailed decomposition by sector, and a similar table of the growth of components of domestic demand. Such information could be shown graphically instead,[84] but this has not always been done in recent Monetary Policy Reports, leading to a loss of insight into what is driving developments in GDP and domestic demand. So, the recent omission from the Report of this useful information deserves to be reconsidered.

Chapter IV on *Prices and Costs* often included one table, showing inflation indicators at monthly frequency going back at least around a year. This information can be shown (more) effectively graphically instead,[85] which is usually done. A graph showing the annual percent change of inflation indicators, including CPI and CPIEFE, for several years has long been a fixture of this chapter. It features dashed lines at 2%, 3% and 4%, making it easy to check how the BCCh has performed in terms of achieving its price stability objective, as quantified by its inflation target and tolerance range. The June 2019 Monetary Policy Report, however, did not include any graph showing both CPI inflation and its 3% target. This is a significant omission. The BCCh should make it as easy as possible for people to see to what extent the Bank's price stability objective has been achieved.

Usually, the "Prices and Costs" chapter also includes a graph illustrating the development of labor costs (such as the growth of nominal wages or nominal unit labor costs). This provides a vital indication of inflationary pressures. So, it is surprising that the March 2019 Monetary Policy Report did not include any graph of labor costs (or even employment). Considering the uncertainty surrounding the effects of the recent large influx of immigrants, labor costs and other developments in labor market pressures deserve due attention in the Report.

(b) Write-up and Presentation

First, it is not always clear how a variable is defined or how it should be interpreted. This is a recurrent issue for the (nominal and real) exchange rate, for which the definition is commonly not specified, not even in the notes of graphs or the Glossary section at the end of the Monetary

[84]/ For instance, see Monetary Policy Report, December 2018, Figure III.5.

[85]/ For instance, see Monetary Policy Report, September 2018, Figures IV.1 and IV.2.

Policy Report.[86] The main text often does not clarify how to interpret changes in the exchange rate either.[87] Considering the importance of the exchange rate for a small open economy like Chile, this is a significant omission and it could easily be remedied by referring to a strengthening or weakening of the peso (or more technically, an appreciation or depreciation), instead of a decrease or increase of the exchange rate.

In addition, the meaning of specialist terms or abbreviations is sometimes not provided, not even in the Glossary or Abbreviations section at the end of the Monetary Policy Report.[88] Besides being incomplete, these sections also suffer from not always being in alphabetical order in the English version of the Report, making them cumbersome to use.

There are also recurring cases where the label used for a variable is inaccurate,[89] or the terms in which a variable is expressed are not clearly indicated, even in key tables in the Monetary Policy Report Summary.[90]

The description of the tables and graphs in the main text is usually quite terse and sometimes disregards important information.[91] Occasionally, the clarity of a graph is reduced by basic formatting issues, such as the use of quite thick lines for several variables in one graph, causing the precise path for a variable to be obscured.[92]

Finally, translation glitches in the English version of the Monetary Policy Report are frequent. Some are minor and hidden in the notes of tables or figures, but others are more noticeable and potentially confusing, especially when acronyms, labels or legends are not translated.[93] Furthermore, the usage of certain terms comes across as odd. For instance, 'evolution' is often used instead of (sometimes fast-changing short-term) 'developments', 'dynamism' appears to mean 'strength', and 'impulse' (which is neutral about direction) actually refers to 'stimulus', while 'bounded' (which is uninformative about the magnitude) is used instead of 'limited'. These terms are also commonly used in the MPM statements and minutes. The BCCh should review their usage because they could cause confusion and misinterpretation.

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[86]/ For example, Figure II.5 in the March 2019 Report simply refers to the "Nominal Exchange Rate" (NER) and "Multilateral Measures" (such as MER). The Glossary does not provide any additional information on the former, while MER is specified as a *"measure of the nominal value of the peso against a broad basket of currencies, weighted as for the RER"* (p. 52), followed by a list of countries that are included. The RER is specified as *"Real Exchange Rate. A measure of the real value of the peso against a basket of currencies, which includes the same countries used to calculate the MER."* (p. 52) So, the MER and RER weights remain a mystery. The deflator used to compute the RER is not specified either. Furthermore, the statement that the MER (RER) is a measure of the nominal (real) value of the peso suggests that an increase corresponds to an appreciation of the peso. The latter then also applies to the NER since it is strongly positively correlated with the MER (as shown in Figure II.5). According to the note to Table II.1 (on the subsequent page), however, an increase in the NER indicates a depreciation of the currency (against the U.S. dollar).

[87]/ For instance, the June 2019 MPR simply stated that the real exchange rate showed "a recovery after [a] decline" (p. 20).

[88]/ For instance, the March 2019 MPR does not explain what the variables "IMACEC" and "IMACON" (shown in Figures III.2 and III.5, respectively) refer to.

[89]/ For instance, the Table of "Inflation indicators" commonly featured in MPR chapter IV refers to "Goods" and "Services", but upon closer inspection it appears these actually refer to CPIEFE goods and CPIEFE services, so excluding food and energy. They are correctly labeled in the Figure of "Inflation indicators".

[90]/ For instance, the table "International Baseline Scenario Assumptions" suggests that the variable "Libor US$ (nominal, 90 days)" is expressed in "levels", whereas it is actually in percent (which can be easily clarified by adding "in %" to the parentheses). And the table "Economic Growth and Current Account" suggests that the first group of variables are all expressed as "annual change. percent" [sic], whereas a handful of variables at the end of this group are not percent annual changes at all, but instead expressed as a percent of GDP (which can easily be rectified by adding the header "percent of GDP" for these variables).

[91]/ For example, the September 2016 Monetary Policy Report simply states regarding Figure III.4 that *"[t]he main consumption fundamentals have not changed: consumer expectations (IPEC) are still pessimistic"* (p. 22), without noting that IPEC had declined to its lowest level since 2008 and that its persistence at very low levels (around 35, where 50 is neutral) was now clearly worse than during the global financial crisis.

[92]/ For instance, in Figure I.10 of the September 2016 Monetary Policy Report the dynamics of the copper price cannot always be distinguished.

[93]/ To give some examples from the March 2019 Monetary Policy Report: "TCR" in the Summary, "IPCSAE" in Figure V.4, and "FBKF" in Figure V.14; the title byline in Figure V.3; and the legends of Figures V.8 and V.9 (e.g. "Brecha IPoM").

Appendix 7:
Detailed Comments on BCCh Website

The BCCh's home page gives direct access to the latest news, including policy announcements and statistics releases, and shows some daily indicators (e.g. UF and exchange rates). In addition, it provides links to a list of press releases on monetary policy meetings and the latest Monetary Policy Report and Financial Stability Report. There are also links to the full lists of news and of publications, but the former cannot be filtered by type, and neither can be filtered by period, making them cumbersome to use.

The website is structured into five sections: *Central Bank of Chile, Monetary Policy, Financial Policy, Financial Markets,* and *Statistics.* The home page also includes a link to a "Site Map", which has the same structure, but none of the links for Monetary Policy or Financial Policy work in the English version of the site (and many do not work in the Spanish version either).

The *Monetary Policy* web page provides links to the latest Monetary Policy Report, a list of previous Reports, a list of MPM press releases and minutes, and a list of other monetary policy meeting material in Spanish. It also features the latest (CPI and CPI- EFE) inflation figures and the monetary policy rate, and links to a few highlighted publications, but there is no (link to) information about the BCCh's monetary policy framework.

The Monetary Policy section has four subsections: *Monetary Policy Report, Monetary Policy Meeting, Monetary Policy Rate,* and *Inflation*. The first provides the main objectives of the Monetary Policy Report, a brief (out-of-date) general description of its contents, and a link to the pdf of the latest Report. The Spanish version of the Monetary Policy Report web page provides much more information, including a list with links to the Boxes in the Report, a list of Excel files (since 2018) with all the graphs in the Report (by chapter and Box), and sometimes useful supplementary documents ("*Documentos Anexos*"), including the flagship research report or some of the unpublished papers by BCCh staff cited in the Report ('*Minutas Citadas*'), such as a long (83-paged) document in June 2019 detailing the revised estimation of structural parameters (available in Spanish only). The Monetary Policy Report webpage, however, generally does not provide any links to the Governor's presentations (statements or webcasts) of the Report at the press conference and before the Senate. In fact, it is very hard to find any link on the BCCh website to their webcasts.

The Monetary Policy Meetings web page provides a brief summary of the process, the schedule for the current year, and a list of links to the press releases and minutes (by year), although there are a few glitches.[94] And the Monetary Policy Rate and the Inflation web pages only show a graph of the monetary policy rate and (CPI and CPI- EFE) inflation since 2003. The 3% inflation target is not indicated in the latter. Moreover, none of the web pages in the entire Monetary Policy section make any mention of the BCCh's inflation target.

[94]/Selecting any year before 2012 yields no results. Also, after stating that the "MPM minutes" are published after 11 bank business days, it is confusingly claimed that the "minutes of the monetary policy meeting" are released after ten years.

Appendix 8:
Detailed Comments on BCCh Statistics

The BCCh website's elaborate *Statistics* section reflects its legal duty (by Section 53 of the LOC) to compile and publish the main macroeconomic statistics in a timely fashion. The BCCh provides an unusually rich set of macroeconomic and financial statistics,[95] which is very useful for monetary and financial policymaking (as well as research).

Notable is the CPI-indexed unit of account UF, which is widely used in Chile (e.g. for house prices). Furthermore, the BCCh publishes the monthly indicator of economic activity, IMACEC (*Indicado Mensual de Actividiad Económica*), which covers all goods and services included in GDP and is available after around a month (including a separate index for the mining and non-mining sectors), providing much more timely information than quarterly GDP statistics.

In addition, the BCCh regularly conducts surveys to measure expectations of macroeconomic variables: the monthly EES of academics, consultants and executives or advisors of financial institutions; and since late 2009 also the FTS, which is confined to financial institutions in Chile, and conducted both before and after each monetary policy meeting.[96] It also publishes the quarterly *Business Perceptions Report*, which summarizes the opinions and perceptions of corporate executives from approximately 220 firms from across the country, based on interviews by BCCh economists.

The BCCh communicates the main macroeconomic statistics in a series of publications,[97] most of which are only available in Spanish. Moreover, the BCCh's extensive online Statistics Database (Base de Datos Estadísticos, BDE) provides direct access to its statistics,[98] with a convenient feature to generate graphs, although detailed methodological information is less accessible[99] and only appears to be available in Spanish. The Statistics Database could also be made more user friendly in other ways.[100]

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[95]/ It releases (business) daily data on the CPI-indexed unit of account UF; foreign exchange (FX) rates, net FX positions and FX turnover (for spot and derivatives); key commodity prices; average deposit and lending interest rates in the financial system (by maturity, nominal and indexed to UF); and monetary aggregates (with a delay of a few weeks). It provides weekly data on the trade balance (including exports and imports by sector), BCCh's international reserves, and average lending rates for consumers (nominal), businesses (nominal), housing (indexed to UF) and foreign trade (in USD). In addition, the BCCh publishes a monthly indicator of economic activity (IMACEC); monthly data on deposit balances (by type), loan balances (by type and sector) and balance sheet data for the financial sector; foreign interest rate derivatives (net positions and turnover) and commodity derivatives (amount and volume). At quarterly frequency it provides a full set of national accounts data.

[96]/ *Encuesta de Expectativas Económicas* (EEE) and *Encuesta Operadores Financieros* (EOF), respectively. The latter is referred to as the *Financial Brokers Survey* (FBS) in Monetary Policy Reports. Both surveys have around 50 to 60 respondents.

[97]/ These include the Daily Bulletin on National Financial Operations (*Informativo Diario de Operaciones Financieras Nacionales*), Monthly Report on Monetary and Financial Statistics (*Informe Mensual de Estadísticas Monetarias y Financieras*), Monthly Report on Foreign Exchange Market Statistics (*Informe Mensual de Estadísticas del Mercado Cambiario*), Bank Data Series (*Serie de Datos Bancarios*), Monthly Bulletin (*Boletín Mensual*), Foreign Trade Indicators (*Indicadores de Comercio Exterior*), Macroeconomic and Current Indicators (*Indicadores Macroeconomicos y de Coyuntura*), and quarterly reports and digital yearbooks on the national accounts and on Chile's balance of payments, international investment position and external debt.

[98]/ https://si3.bcentral.cl/Siete/secure/cuadros/home.aspx?Idioma=en-US

[99]/ The "Methodologies" link on the Statistics Database website misdirects to the BCCh's main Statistics web page.

[100]/ For instance, daily data is only available for one calendar year at a time in the main pane; although a customized range can be selected in the graph feature, it only goes back three years. Variables available at "daily" frequency (e.g. the monetary policy rate) cannot be combined in the selection basket (and graph) with variables at "business" frequency (such as other interest rates). No business/daily data appears to be available for 1-day interbank interest rates. And for some variables (e.g. monetary policy rate and exchange rate) it would be helpful to provide end-of-period values in addition to period averages.

The BCCh also provides a handy mobile Statistical Database (*BDE Móvil*), which is an app (in Spanish and English) that gives access to a range of macroeconomic statistics for Chile and automatically generates graphs. Its use more than doubled in 2018 to 1.6 million visits. The BCCh deserves credit for extending its legal duty to publish the main macroeconomic statistics to smart phone users, although the app could be made more user-friendly.[101]

Another way in which the BCCh manages to make its *Statistics Database* more accessible is through its *Chart Pack*,[102] which provides nice graphs for a range of variables (e.g. quarterly GDP growth, including its decomposition by expenditure components).

Appendix 9:
Policy Assumptions for Macroeconomic Projections

For their macroeconomic projections, central banks have used several assumptions for the monetary policy rate, including a constant policy rate, market expectations, a monetary policy reaction similar to a Taylor rule, or the central bank's own projected policy rate path.

One option is to assume that the monetary policy rate remains constant at its existing level over the policy horizon.[103] This assumption is simple to communicate and makes it easy for inflation targeting central banks to explain the need for policy rate adjustments. If the inflation projection based on the constant policy rate is above (below) the inflation target by the end of the policy horizon, then the policy rate needs to be raised (reduced). Following other central banks such as the Bank of England, the BCCh initially used this constant policy rate assumption for the macroeconomic projections in its Monetary Policy Report (from 2000 until mid-2004).

It is very unlikely, however, that the policy rate will remain constant over the policy horizon. So, the macroeconomic projections that are based on this unrealistic assumption are unlikely to be good forecasts of future macroeconomic outcomes, which makes them less valuable to the private sector, although they are still useful to understand and assess monetary policy decisions.

Furthermore, it is usually very unlikely for the private sector to expect the policy rate to remain constant over the entire policy horizon.[104] This means that current asset prices (such as foreign exchange rates, bond and equity prices), which are based on private sector expectations of future monetary policy settings, are usually inconsistent with the assumed constant policy rate. Since asset prices affect private sector saving, investment and other economic decisions, and thereby economic activity and inflation, this implies that current levels of macroeconomic variables are inconsistent with the constant policy rate that is assumed for the projections of these variables. In other words, the projection assumption is not consistent with current asset prices and macroeconomic outcomes. If people had expected the constant policy rate, the current level of asset prices and other macroeconomic variables would have been different.

[101]/ For instance, the app automatically jumps back to the main menu when not used for a few moments.

[102]/ https://si3.bcentral.cl/SetGraficos/Default.aspx?Idioma=en-US

[103]/ Assuming that the nominal policy rate also remains constant beyond the policy horizon could lead to serious macroeconomic instability because an increase (decrease) in inflation would tend to reduce (raise) the real interest rate, thereby exacerbating the change in inflation, so some policy reaction function would have to be assumed to prevent that.

[104]/ An exception is when the policy rate is at its effective lower bound and the central bank has provided forward guidance to keep it at that level for several years.

Note that this inconsistency in principle also applies to any other policy rate path that differs from market expectations, although the issue is minor if the difference is very small.

In the case of the BCCh, its estimate of the neutral policy rate before the June 2019 revision appeared to be substantially above market expectations. If the private sector had expected such higher future policy rates, then longer-term bond yields, which reflect expected future policy rates, would have been significantly higher, so economic growth would have been lower, and inflation would have been even further below its 3% target.

Disregarding this inconsistency, one could simply take current macroeconomic outcomes as given (as macroeconomic projection models generally do) and just take into account that asset prices and thus future macroeconomic outcomes would adjust to the assumed policy path. However, it would be hard to predict how the private sector would actually react, and asset prices would adjust, if the policy rate were to significantly deviate from market expectations. Thus, projections based on a policy path that is quite different from market expectations are likely to be less reliable.

For these reasons, it is sensible to base macroeconomic projections on the assumption that the policy rate path is equal to market expectations. It is consistent with current asset prices and macroeconomic outcomes, and expectations about the future can be inferred from financial asset prices. This assumption can be communicated transparently, by stating exactly which expectations and what statistical cut-off date is used, and publishing the assumed policy path, preferably also graphically. The latter is important to explain monetary policy decisions when macroeconomic projections are based on market expectations. In this case, the central bank should adjust the policy rate in line with the market expectations on which the projections are based, but raise (reduce) the policy rate above (below) market expectations if the inflation projection is above (below) the inflation target by the end of the policy horizon. Assuming a policy rate path in line with market expectations has been used by many central banks, including the BCCh and the Bank of England, which still uses it.

Nevertheless, this gives rise to the question by how much the policy rate should be adjusted to achieve the inflation target by the end of the policy horizon. Many central banks use macroeconomic models with a monetary policy reaction function or 'Taylor rule' that describes how the policy rate is assumed to depend on economic activity and inflation. This also holds for the models that the BCCh uses for monetary policy analysis, the semi-structural gap model MEP and the DSGE model XMAS.[105] When central banks use a monetary policy reaction function as a guide for setting the policy rate, they could also use this as the assumption on which their macroeconomic projections are based. In that case, however, it is considerably more challenging to communicate this transparently. The central bank would have to publish the exact monetary policy reaction function that it assumes, including the coefficients for the variables, as well as the precise policy rate path that it generates, preferably also graphically. Otherwise it cannot clearly explain whether the policy rate needs to be adjusted.

[105]/ MEP assumes a Taylor rule in which the deviation of the policy rate from its neutral level depends positively on the output gap and on the deviation of expected future core inflation from the inflation target, with some interest rate smoothing. XMAS features a Taylor rule with interest rate smoothing in which the nominal interest rate depends positively on the change in a measure of output and on the deviation of an inflation measure, based on a weighted average of current and expected future CPI and core inflation, from a stochastic inflation target.

An additional complication is that the path implied by the monetary policy reaction function is unlikely to correspond to the policy rate path that the central bank expects, because the central bank does not mechanically follow the former, but also uses judgment in its policy decisions. Thus, the policy rate path that the central bank assumes for its projections may not be the same as the policy rate path projected by the central bank, which can be very confusing for the public.

According to the document in which the BCCh describes its monetary policy framework (BCCh, 2007), the Bank's macroeconomic projections are based on a "working assumption" for the path of the monetary policy rate that is based on a Taylor rule, which *"does not attempt to literally reflect how the Central Bank's Board sets the monetary policy rate, but rather to serve as an analytical premise used to project inflation and growth"* (p. 22). The policy rate path is set to be consistent with CPI inflation reaching its 3% target by the end of the two-year policy horizon. The latter makes it even more important to clearly specify the presumed policy rate path. When the CPI inflation projection always reaches 3% two years ahead, the critical question is to what extent this is due to (the) anticipated (dissipation of) shocks or adjustments of the policy rate. Without knowing the latter, the inflation projections are not very informative, making it hard to explain monetary policy decisions based on them.

The BCCh has often sketched the policy rate path used for its macroeconomic projections qualitatively in relation to expectations based on private sector surveys or financial asset prices. This gives rise to the question how it compares to them and whether it provides a better estimate of the monetary policy rate. Data provided to us by the BCCh shows that during the last decade, the policy rate path it has used as a "working assumption" for the baseline projections in the Monetary Policy Report has differed considerably from the forward curve in the same Report and average expectations from the pre-MPM FTS and EES surveys from the same month,[106] especially at a horizon of one to two years, as shown in Table 1. The start of the sample period (in March 2010, and for three months ahead in September 2011) is determined by availability of FTS data. The Table shows that the BCCh's policy rate path has on average been noticeably above the forward curve and (EES and FTS) survey expectations, except for the short three-month horizon. At the one-year horizon, the BCCh's policy rate path has an average been 40 basis points above the subsequent realization of the monetary policy rate, compared to at most 20 basis points for the forward curve and FTS and EES expectations. At the two-year horizon, all display a sizeable upward bias, although it is again much larger for the BCCh policy rate path (by at least 20 basis points). At the one- and two-year horizons, the magnitude of the bias is smallest for FTS expectations.[107] They also exhibit the best overall forecast performance based on the root mean squared error (RMSE) at the two-year horizon, although EES performs better at the 6-month and one-year horizons. In short, during the last decade the monetary policy rate path used for the BCCh's projections has shown a substantial upward bias at one- to two-year horizons, while expectations of the monetary policy rate from the (pre-MPM) FTS have exhibited a much smaller bias, which may make them more suitable as a conditioning assumption for the BCCh's macroeconomic projections.

Some central banks would like to provide greater transparency by publishing medium-term projections not only for inflation and economic activity, but also for the policy rate. In that case, it is natural to base the macroeconomic projections on the projected policy path. This has become the

[106]/ Results are broadly similar for median FTS and EES expectations, although the small, statistically significant bias for 3-month-ahead FTS expectations disappears. Using all monthly observations for the (pre-MPM) FTS and EES gives similar results.

[107]/ The difference in bias of around 20 bp between the forward curve and expectations from the Financial Traders Survey at the two-year horizon could be due to the presence of term premia, which complicates the computation of forward rates.

preferred option of several central banks, including the Swedish Riksbank. Such projections have the advantage that they are unconditional in the sense that they describe both the policy actions and policy outcomes that the central bank expects. In addition, it is easy to explain the policy rate decision in this case because the adjustment required to achieve the inflation target is shown by the projected policy rate path. But if the latter differs significantly from market expectations, then the projections are inconsistent with current asset prices and macroeconomic outcomes, and likely to be less reliable, as previously explained. In addition, the publication of the projected policy path is a comprehensive form of (time-dependent) forward policy guidance, which is discussed in greater detail in Section 4.

Table 1.

Forecast Performance of BCCh Monetary Policy Rate Path and Expectations.

Monetary Policy Rate Path and Expectations	Bias	RMSE
Three months ahead (9/2011 - 3/2019)		
BCCh monetary policy rate path	0.063	0.241
Forward curve	0.054	0.245
FTS	-0.049**	0.147
EES	0.024	0.147
Six months ahead (3/2010 - 12/2018)		
BCCh monetary policy rate path	0.098	0.392
Forward curve	-0.113	0.561
FTS	-0.027	0.373
EES	-0.023	0.370
One year ahead (3/2010 - 6/2018)		
BCCh monetary policy rate path	0.399***	0.716
Forward curve	0.192	0.695
FTS	0.169	0.728
EES	0.202*	0.618
Two years ahead (3/2010 - 6/2017)		
BCCh monetary policy rate path	1.189***	1.374
Forward curve	0.981***	1.220
FTS	0.766***	1.110
EES	0.977***	1.156

Note: BCCh monetary policy rate path ("working assumption" used in Monetary Policy Report) and expected monetary policy rate based on forward curve (from Monetary Policy Report), Financial Traders Survey (FTS, before monetary policy meeting, mean) and Economic Expectations Survey (EES, mean), with sample periods in parentheses. Bias equals path or expected minus actual rate.

Asterisks indicate statistical significance at *** 1%, ** 5% and * 10%, based on robust (HAC) standard errors. RMSE is root mean squared error. Source: BCCh.

Appendix 10:
BCCh Forward Guidance during the Global Financial Crisis

After the collapse of Lehman Brothers, the BCCh provided time-dependent forward guidance in all its monetary policy meeting statements from December 2008 until mid-2011.

The policy rate had reached 8.25% in early September 2008 (following four consecutive 50 basis point rises) to counter persistently high inflation (with CPI inflation peaking at 9.9% in October 2008). The BCCh signaled the start of an easing cycle with qualitative forward guidance in December 2008,[108] with similar guidance provided after a 100 basis point rate cut in January 2009. At the subsequent monetary policy meeting in February 2009, the policy rate was cut by 250 basis points and more detailed forward guidance was provided about the likely path of the monetary policy rate.[109] After another 250 basis point rate cut in March 2009, the BCCh signaled additional though more gradual easing.[110] The monetary policy rate was reduced by 50 basis points in both April and June 2009, with the post-meeting statement indicating that "additional […] cuts might be necessary".

In June 2009, after another 50 basis point reduction in the monetary policy rate, the BCCh changed its forward guidance to indicate that the monetary stimulus was likely to be longer than anticipated by financial markets.[111] On 9 July 2009, the monetary policy rate was reduced by 25 basis points to 0.50% and the post-meeting statement declared that the rate had "reached its lower limit". In addition, it stated that the rate "would be kept at its lower limit for a prolonged period". Furthermore, "to reinforce this decision and to align financial asset prices with the monetary policy path", the Board announced "complementary monetary policy measures", including the term liquidity facility (FLAP) providing funds on demand at a rate of 0.50% for up to 180 days, and the suspension of the issuance of debt securities by the BCCh with maturities of at least one year for the remainder of 2009. These complementary measures indicated that the "prolonged period" would last (at least) six months.[112] The forward guidance, term liquidity facility and suspension of BCCh debt issuance would all be expected to reduce medium-term yields.[113] Céspedes et al. (2014) found that the announcement indeed had the effect of flattening the nominal yield curve, with a decline in medium-term yields by up to 30-50 basis points, providing significant additional monetary stimulus.

[108]/ *"The Board considers that, in the most likely scenario, a process of monetary easing will begin, the pace of which will depend on inflation prospects."* (Monetary policy meeting statement, 11 December 2008).

[109]/ *"The Board considered that in the most likely scenario, the [monetary policy rate] path would be lower than projected in the baseline scenario of the Monetary Policy Report, and in the short term would converge to the levels implicit in financial asset prices for the middle of the year."* (MPM statement, 12 February 2009). Note that this suggests that the monetary policy rate path in the baseline scenario of the Monetary Policy Report is a projection, whereas the Report refers to it as a "working assumption" or "methodological assumption".

[110]/ *"The Board considered that additional [monetary policy rate] cuts might be necessary, though of a size and frequency on par with historical trends."* (MPM statement, 12 March 2009).

[111]/ *"The Board considered that in the most probable scenario, it would be necessary to maintain the monetary stimulus longer than was implicit in financial asset prices."* (MPM statement, 16 June 2009).

[112]/ It would be challenging to increase the interbank rate to a higher level if banks can get funds on demand from the BCCh at 0.50% through FLAP.

[113]/ Whereas forward guidance may have mostly had a signaling effect that lowered expectations of future policy rates, the term liquidity facility and suspension of BCCh debt issuance are also likely to have had portfolio rebalancing effects that reduced the term premium.

Subsequent MPM statements until October 2009 continued to provide qualitative time-dependent forward guidance by stating that the Board "reiterated that the [monetary policy rate] would remain at its lower limit of 0.50% for an extended period". In contrast to the forward guidance provided before reaching the effective lower bound of the policy rate, the tone had changed from a probabilistic indication (typically featuring 'likely') to a declarative statement. Nevertheless, it was not a switch from 'Delphic' forward guidance to an 'Odyssean' commitment, because the BCCh Board would add in the post-MPM statements that "it would continue to use its policies flexibly so that projected inflation would converge to 3% in the policy horizon."

In November 2009 the BCCh announced that it would start to gradually reduce the maximum maturity of the term liquidity facility (FLAP) to close it in May 2010. In addition, it provided some forward guidance about normalizing the monetary policy rate in the second quarter of 2010 more gradually than was anticipated by financial markets.[114] Similarly, the post-MPM statement on 15 December 2009 stated that the rate of monetary policy rate normalization would be more gradual than implicit in financial asset prices, but comparable to monthly survey expectations. Furthermore, the Board started providing calendar-based forward guidance by stating that it considered that "the macroeconomic environment is consistent with holding the [monetary policy rate] at its lower limit of 0.50% at least until the second quarter of [2010]." This was followed by a 23 basis point drop in two-year (BCP/BTP) bond yields on 16 December,[115] and another 10 basis point decline the next day. The calendar guidance was repeated during the first quarter of 2010, but in April it was replaced by some forward guidance on the normalization of monetary policy.[116] In May 2010, the post-meeting statement signaled that "[t]he Board considers that the time is approaching to start the process of normalizing monetary policy".

The BCCh began increasing the monetary policy rate in June 2010 (starting off with four consecutive rate hikes of 50 basis points), while providing forward guidance that it will (or will be necessary to) continue reducing the monetary stimulus, "although the rate of withdrawal will depend on the evolution of internal and external macroeconomic conditions." The forward guidance in the post-meeting statement about a continued reduction of monetary stimulus was modified in May 2011 (when the rate was raised to 5%) to refer instead to "additional increases in the monetary policy rate". At the next two meetings, the qualifier "under the most probable scenario" was added. The use of forward policy guidance was discontinued in August 2011.

So, during the global financial crisis and its aftermath, the BCCh was a very active user of time-dependent forward guidance for 2.5 years, which was mostly qualitative, but also included quantitative, calendar-based guidance for several months, and occasionally some guidance about the policy rate path.

[114]/ *"The Board considered that the rate at which the [monetary policy rate] would be normalized in the second quarter of the coming year would be more gradual than was implicit in financial asset prices."* (MPM statement, 12 November 2009).

[115]/ This may also be due to the release of the December 2009 Monetary Policy Report that day.

[116]/ *"The Board considers that the macroeconomic environment and private expectations are consistent with the normalization of monetary policy as described in the last [Monetary Policy] Report."* (MPM statement, 15 April 2010).


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