New Frameworks for Monetary Policy Analysis in an Era of Crises*
Opening Remarks

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Good morning. It is a pleasure for me and for the Central Bank of Chile to be hosting the Fourth Annual Fall Conference of the International Journal of Central Banking. Since its beginnings, this conference has gathered distinguished academics, policymakers, and researchers from global universities and central banks to listen to new research and have an open discussion on topics of interest for academics and central bankers. This is not the exception. We meet today and tomorrow to discuss new frameworks for monetary policy in an era of crisis. This discussion is appropriate and necessary. The events that have transpired since the collapse of Lehman Brothers and the ensuing financial distress, global recession, and sovereign problems have led the profession to reassess the role of financial markets as sources of shocks and as amplifying mechanisms for them.

In this talk I will discuss some of the lessons and challenges for monetary policy that can be drawn from the recent crisis from the perspective of a small open economy like Chile. I will first address the challenges that have arisen from the need to incorporate financial frictions in our modeling frameworks. Next, I will extend this discussion to the challenges faced by small open economies within a context in which global financial stress has induced significant movements in capital inflows and exchange rates.

1. Incorporating Financial Frictions into Macro Models

Modern central banks use macroeconomic models aimed at capturing the key economic forces operating in each country. While large-scale econometric models have been in use for quite some time, during the last fifteen years many central banks and multilateral

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organizations (like the International Monetary Fund) have also incorporated medium- and large-scale estimated monetary dynamic stochastic general equilibrium (DSGE) models in their toolkit. These models introduce price and wage stickiness, which are key elements to understanding the relationship between monetary policy, inflation, and the business cycles. Most frictions included are microfounded, and, as a consequence, different shocks may be given a structural interpretation. In addition, these models fit aggregate data well by conventional econometric measures. For these reasons, this class of models has become a standard practice in modern central banks: the NEMO in Norway, the RAMSES in Sweden, the SAMBA in Brazil, and the MAS in Chile share many similarities and, at the same time, introduce some relevant country-specific features, such as a fiscal policy rule, a commodity production sector, imperfect exchange rate pass-through, and so on.

The resulting calibrated DSGE models have proven to be useful in our policy discussions. They can inform us about the consequences, both in terms of timing and of magnitude, of different shocks. These models are also useful for assessing the implications of alternative monetary policy responses or changes in some key structural parameters and, as mentioned above, have been extended in several important dimensions.

These models, however, did not explicitly incorporate financial frictions and financial intermediation. Accordingly, they were of limited use in understanding the origin and propagation of shocks during the recent financial crisis. Furthermore, the absence in their structure of a banking sector that may default in equilibrium implies that the financial stability issues that concern many central banks nowadays cannot be explored with this framework.

This shortcoming is important because the recent crisis has reminded us that the financial sector may be both a source of shocks and an amplification mechanism for these shocks, with potentially important consequences for the economy and for the effectiveness of policy tools.

Thus, finding ways to include qualitatively and quantitatively meaningful financial frictions in policy models is still a challenge. Admittedly, recent years have seen a big effort by academics and policymakers to incorporate financial channels into macroeconomic models, an effort that is yielding some important advances. Existing

models of financial frictions have been refined to construct narratives of the recent crisis. Others are trying to explicitly model the banking sector and its interaction with the rest of the economy.[1] This research agenda is generating an important volume of academic publications as well as an increasing number of conferences on financial factors and monetary policy (just like this conference!).

However, from a quantitative perspective, it has been hard to come up with financial friction models that can deliver fluctuations of the size and persistence observed in recent years and that can also be realistically calibrated or estimated and appended to our standard macro models.[2] Hopefully, such combination will deliver non-linear responses to relevant shocks, so they are useful for understanding crisis episodes, and (locally) linear responses to normal events that allow us to gather intuition about the main elasticities and transmission channels under operation in normal times. There is, therefore, still some road ahead on this front.

Furthermore, beyond technicalities, the profession has yet to reach a consensus on the relative importance of financial frictions to the supply of or demand for credit.[3] Most traditional models of frictions emphasized shocks to demand coming from the deterioration of the pledgeable income of borrowers.[4] With some exceptions, less emphasis had been put on shocks to the supply of funds because of disruptions to the intermediation process before the crisis.[5] While both approaches may yield similar reduced-form fluctuations in credit and output, and thus account for some of the stylized facts of the crisis, they may have very different implications for the most appropriate policy responses aimed at dealing with episodes of financial stress. For instance, is it better to provide support to borrowers or lenders? In practice, during financial crises it is usual to see both types of support, to borrowers and lenders. For instance,

[1] See Goodhart, Sunirand, and Tsomocos (2005, 2006), Gertler and Kiyotaki (2010), and Gertler and Karadi (2011), among others.

[2] See Kocherlakota (2000) and Chari, Kehoe, and McGrattan (2005).

[3] See Adrian, Colla, and Shin (2012).

[4] See, for instance, Kiyotaki and Moore (1997) and Bernanke, Gertler, and Gilchrist (1999).

[5] Some articles that focus on shocks to intermediaries are Shleifer and Vishny (1997), Holmstrom and Tirole (1998), Kashyap and Stein (2000), and Brunnermeir and Pedersen (2009).

in our big financial crisis in the 1980s, several measures were taken to provide support both for financial institutions and for consumers and firms.

We at the Central Bank of Chile have adopted a two-pronged strategy to deal with this issue. On the one hand, we have been actively gathering knowledge and discussing the various ways in which financial frictions and financial shocks affect our country. For instance, we consider the impact of financial frictions in our forecasting exercises based on empirical correlations between domestic and international spreads and variables like the country's net foreign asset position or global financial conditions. On the other hand, we are working on a preliminary version of our main DSGE model that incorporates the traditional financial accelerator mechanism.

2. Surges in Capital Inflows to Emerging Markets

Let me now refer to the second issue I outlined above: the challenges faced by small open economies within a context of significant movements in capital inflows and exchange rates. While the relevance of financial frictions and financial shocks may have been an unexpected event for developed countries, emerging economies have, sadly, long been aware of them.

Furthermore, in emerging markets, financial shocks and amplification have been closely associated with volatile capital flows. It is well known that during the last decades emerging economies experienced several episodes of capital flow reversals, known as "sudden stops." In a similar pattern to the one recently observed in several countries, these sudden stops are usually preceded by periods of large capital inflows, rapid credit expansion, and upward pressure in exchange rates and real-estate prices that may result in imbalances and mismatches. These conditions may increase the vulnerability of receiving economies to "sudden stops," leading them to result in large output contractions and financial distress.

The previous experiences with volatile capital inflows have led emerging markets (and even some developed countries) experiencing significant post-crisis capital inflows to be cautious. Capital flows to emerging markets have rebounded with the ebbing of the global financial crisis of 2008–09. The largest recipients are Asian and Latin American economies, South Africa, and Turkey. In several countries,

net inflows are close to all-time highs, although on a gross basis total inflows to emerging markets have yet to reach their pre-crisis peak. Nonetheless, compared with their pre-crisis behavior, the current episode is characterized by a larger share of portfolio inflows, which tend to be more volatile than foreign direct investment (FDI) flows.[6] In Chile, long-term FDI flows still constitute the majority of gross inflows to the country.

In a context of extended global liquidity to emerging economies, policymakers in these countries face several challenges. Should a country worry about being at the receiving end of large capital inflows? If so, what are the most efficient policies to deal with these capital inflows, and what is the role of central banks?

As previously mentioned, emerging markets could have reasons for concern about surges in capital inflows, but it is unclear under what conditions those concerns merit policy action and what those actions should be. Capital inflows are unlikely to be harmful in the absence of frictions to resource reallocations or other externalities, and a simple first-best argument would ask policymakers to undo the frictions that are behind sub-optimal allocations or mismatches. There are, however, two problems with this approach: first, there is no academic consensus on the precise nature of these frictions, and second, correcting them may not be feasible within the time frame required for policy action. This means that second-best policies may be the only ones at hand.

The potential need to act on the face of surges of capital inflows has led to a broad consideration of the available options and policy tools by countries and international institutions. These options include letting the exchange rate fluctuate, adjusting the policy rate to avoid pulling in more capital, tightening fiscal policy to allow space for monetary easing, using macroprudential tools to reduce the imbalances and mismatches that may be associated with fast credit expansion, purchasing foreign exchange reserves, and temporarily reducing the degree of financial integration through the use of some form of capital controls. While some of these policies may be in the scope of action of central banks, others require close coordination with other authorities.

If flows are not considered to be excessive and key relative prices not misaligned, the standard framework of inflation targeting and

[6]See International Monetary Fund (2011).

exchange rate flexibility can accommodate capital flows with moderate exchange rate volatility and temporary real appreciation. These "normal" conditions also offer the opportunity to advance in financial regulation and financial development that help address some of the micro-level frictions that may be the ultimate cause of problems with large capital inflows.

But the standard toolkit of the inflation-targeting framework is subject to important challenges in situations of capital inflow surges related to temporary global liquidity or macroeconomic conditions. Under these circumstances, dealing with inflationary pressures may exacerbate the flows. For instance, raising interest rates in response to expected inflationary pressures may result in further capital inflows coming in search of yield (push factors), and reducing interest rates to stimulate the economy may reduce the incentives of external agents to search for yield but increase domestic demand with a possible widening of current account deficits and demand-driven flows (pull factors). Situations of this type may call for temporary departures from the inflation-targeting/flexible exchange rate framework and for the consideration of some of the alternative policy tools mentioned above.

Along these lines, central banks in different countries have complemented standard policies with other measures. Sterilized interventions in the foreign exchange market have been used by some countries to manage exchange rate volatility, while others have resorted to capital controls in the form of taxes or reserve requirements ratios, or macroprudential policies like limiting loan-to-value ratios. The variety of measures undertaken reflect in part the different circumstances and tools available to different countries, but they also reflect the lack of academic consensus on the best toolkit to deal with surges in capital inflows. There lies a challenge for the profession.

I cannot help mentioning here the different effects of the quantitative easing (QE) measures taken by advanced economies in the last years and, more specifically, in the deepening of these QE measures in the last couple of months. While in principle the adoption of QE should be good news for emerging-market economies since its objective it to produce more growth in advanced economies, it is also true that if QE measures lead to a significant appreciation of the domestic currencies, they may have a negative undesired effect.

In open economies (particularly in small ones) these massive capital inflows, with the associated appreciation, may produce the sort of imbalances described above.

The Central Bank of Chile has flexibility to use several of the instruments described above, such as exchange rate interventions (we used them last year) and temporary capital controls (they were used in the 1990s), if conditions eventually called for it. In any case, however, it is important to be careful in the analysis, as no measure is cost free. Interventions, for instance, have the benefit of increasing the stock of international reserves, which is an insurance for periods with less access to international financing. They may also reduce misalignments. Nonetheless, as it is not simple to define when there is a clear misalignment, there is always the risk of acting too soon, in which case the intervention will be ineffective. On the other hand, a sterilized intervention worsens the balance sheet of the central bank, as the interest rate on foreign reserves is lower than the interest rate on domestic debt.

3. Closing Remarks

Let me conclude this talk with a brief summary of what I see as the main challenges to the profession that arise from the previous discussion. First, introducing financial friction models in the policy analysis is a challenge that the profession is currently addressing, but to this date there are still advances to be made in order to reach a workhorse model that has quantitatively meaningful financial channels, preserves the nature of current models, and is operationally useful. Second, surges in capital inflows have been an important concern for emerging markets, and policymakers are still somewhat in the dark regarding the nature of the frictions being faced, the type of long-term policy changes required to address them, and the appropriate, country-specific short-term policy tools to be deployed. Furthering our understanding of these issues is also crucial for the developing of new frameworks for monetary policy.

I am sure that during this conference we will indeed advance in addressing some of the challenges I have outlined above, and I am looking forward to two days of provoking articles and interesting discussion.

Thank you very much.

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