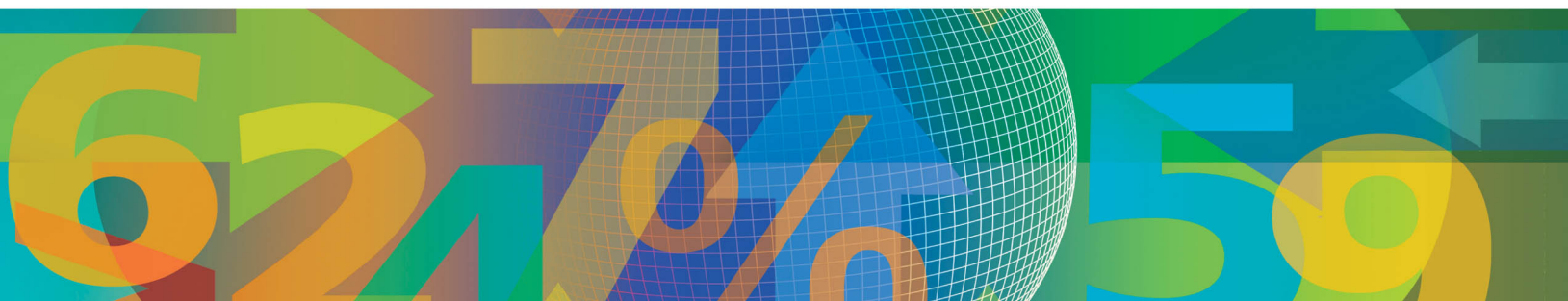


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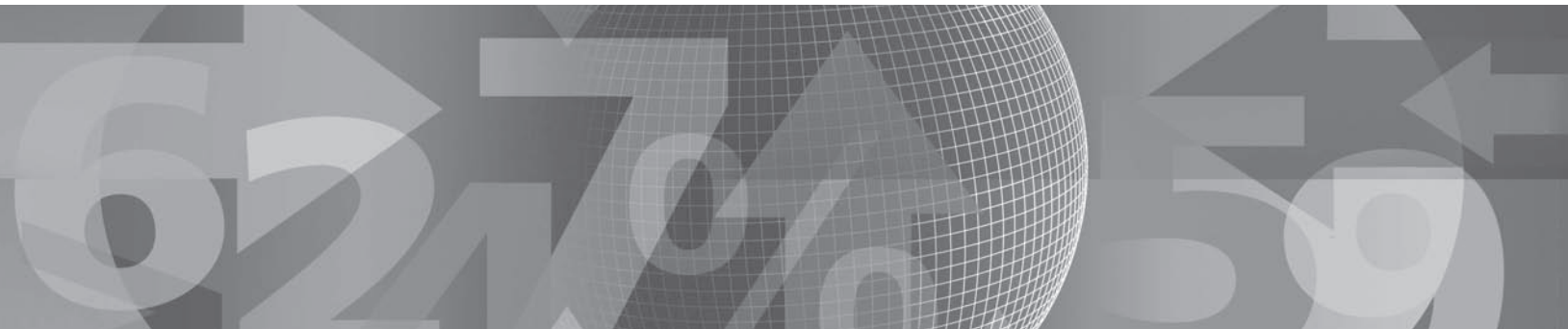
Macroprudential Frameworks in Asia



Rodolfo Maino and Steven A. Barnett

I N T E R N A T I O N A L M O N E T A R Y F U N D

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Foreword

Both Asian and advanced economies have learned from the 1997 Asian crisis and the 2008–09 global crisis the importance of financial stability and the need to prevent financial imbalances by active use of macroprudential policy measures. Most countries have now entrusted their central banks with either sole or shared responsibility for pursuing financial stability in addition to their traditional mandate of monetary stability.

A central bank can pursue and maintain financial stability by preventing financial imbalances from building up; by reducing systemic risk arising from interlinkages, from common exposures, and from procyclicality of the financial system; and by discouraging risk-taking behavior of financial institutions that may have systemic implications. This may sound straightforward, but it is not.

First, how does one define, identify, and measure financial instability?

Unlike price stability, which can be clearly defined as the extent of price increases, measured and monitored using the inflation rate as an index, it is difficult to do so for financial instability. Financial indicators, indices, or even some early-warning data are mostly about individual risk or individual institution risk and may not be able to flag financial instability issues that are systemic in nature and have multiple dimensions.

Second, how can we integrate the information or data into a formal model for vigorous analysis of imbalances or instability or the analysis and implementation of monetary policy, given the limited knowledge we have about the linkages between the real economy and the financial sector? How do we decide what tools to use and what the quantitative impacts of the selected tools are?

Institutional constraints are another major challenge in mitigating systemic risk, especially if the responsibilities for micro- and macroprudential supervision do not reside in the same agency, and coordination between responsible agencies is not well established. How does one ensure effective and efficient coordination mechanisms for close consultation, coordination, and sharing of information of the micro- and macroprudential supervisors so that the interests of all agencies are well aligned and so that the necessary prudential measures can be implemented?

From an emerging market's point of view, there are some recommendations for the enhancement of financial stability:

1. *Regularly monitor the threat of financial imbalances because they can lead to financial instability if left unchecked.* The Bank of Thailand regularly monitors seven areas that are vulnerable to the buildup of financial imbalances, such as the housing and property market, the capital market, and the extent of indebtedness of various sectors.
2. *Use macroprudential measures, which are powerful tools and have been widely used in emerging markets, to preempt the buildup of systemic risk.* The most commonly employed macroprudential tools are the loan-to-value ratio, the debt-to-income ratio, and ceilings on credit or credit growth to address threats from excessive credit expansion in the system; limits on maturity mismatches; caps on foreign currency lending; and levies on noncore funding to address the key amplification mechanisms of systemic risk.
3. *Capacity building in analytical skill and technical expertise for early detection of systemic risk is an urgent need.* Staff members with the skill sets and competency for risk identification usually work in different departments in a central bank, such as examination, supervision, and economic policy. At the Bank of Thailand, we pool these staff members to form a working group, which meets regularly to assess the risk of potential financial instability building up. Although it is difficult to integrate the information or data into a formal model for rigorous analysis of imbalances, the dialogue and views form an important basis for policy formulation. No doubt, significant technical challenges remain and building up our knowledge base and technical expertise is necessary to better understand the complexity of maintaining financial stability.
4. *Capital flows are posing a significant challenge for emerging markets.* Although there are other policies to deal with capital flows, they are not always effective and may pose conflicts at times. Clearly, using monetary policy to cut interest rates to reduce interest rate differentials is not an option now because of the relatively robust economies in most emerging market, and some

may even face the threat of inflation and imbalances. Inflows can lead to financial excesses and disruption can be even bigger when there is a reversal of the flows. It is important that emerging markets take steps, including macroprudential measures, to further strengthen their resilience and ensure that imbalances do not develop as a consequence of the inflows.

5. *Appropriate monetary policy is a necessary condition for financial stability.* It is now well accepted that monetary policy that keeps interest rates low for too long can sow the seeds of instability. If financial imbalances are building up because of accommodative monetary policy, changing the course of the monetary policy is the right approach. Macroprudential measures must not be used to substitute for the necessary adjustments to monetary policy to achieve financial stability.
6. *There must be legal clarity in the mandates of micro- and macroprudential supervisors and clear procedures for coordination and information exchange between them, if they are not the same agency.* In fact, even if both mandates belong to the same authority, which occurs when a central bank also has a bank supervision function, clarity is also very useful for ensuring effective implementation of policy measures for both mandates without concerns of conflicts of interest.
7. *Outside interference and threats to central bank independence from having financial stability as a mandate can arise.* Financial stability tools usually affect only certain economic sectors if financial imbalances are judged to be building up. Hence, central banks could face immense lobbying against and resistance to such measures. Therefore, proper legal provisions and governance structures need to be in place. At the Bank of Thailand, independence is carefully preserved:
 - First, monetary stability is the responsibility of the Monetary Policy Committee, whereas policy formulation and micro- and macroprudential supervision of the financial sector are under the Financial Institution Policy Committee (FIPC). Both committees are headed by the governor of the central bank. Two deputy governors also sit on each committee. For the sake of supervisory coordination, the heads of the Securities and Exchange Commission and Office of Insurance Commission also sit on the FIPC. The remaining members are outsiders, and outnumber internal members.
 - Second, the mandates of each committee are clearly spelled out in the law. Hence, the independence of each committee is legally guaranteed. Since the governor and deputy governors are in the minority, pressuring them would be futile interference. Because

each outside member is proposed, based on his or her integrity, among other things, by the governor for selection by the board and is accountable by law for his or her decisions, the risk of external members being successfully interfered with is deemed minimal. So far, this governance structure has worked well.

8. What is most important in maintaining financial stability is the will to take away the punch bowl when the party gets interesting with monetary policy or macroprudential policy, which are unpopular measures. Without this will, any simple excuse can lead to delayed action or no action. Clear legal mandates and the governance structure discussed above make it somewhat easier for the relevant authorities to make tough decisions. In addition, during normal times, the macroprudential supervisor and the central bank need to have frequent communication with bankers and the general public to build acceptance that the boom-and-bust cycle is detrimental to economic well-being, and it would be in the best interests of all for the authorities to take unpopular measures when needed. It may sound highly idealistic and naive to hope for such acceptance, but with the memories of the global crisis still fresh, now is the best time for this strategy. The fact that most Asian economies have been able to safeguard financial stability with unpopular macroprudential measures may well suggest that they were able to get support from the masses who still remember the pain of the 1997 crisis. This is the case with Thailand, where there have been campaigns for prudent risk management on the part of households and the business sector, including banks and other corporations. Risk awareness and the willingness to trade short-term gains for long-term sustainability are much higher today.

The last important message is to remember that the market only behaves according to the incentives in place. For example, monetary policy that is perceived by the public to remain accommodative for a prolonged period irrespective of economic developments provides fertile ground for financial speculation. Similarly, a policy that leads the public to believe that any asset-price burst will subsequently be supported by accommodative policy can fuel speculation. This is the issue of moral hazard, which policymakers must be very mindful of. Central bankers need to think about these long-term implications even in their pursuit of monetary stability. It is, of course, technically difficult to extend significantly the horizon of monetary policy, with our limited ability to see into the future. But without such awareness, the implementation of monetary policy may have significant adverse impacts in the long run.

Tarisa Watanagase
Former Governor of the Bank of Thailand

Preface

In the aftermath of the 2008–09 global economic and financial crisis, important questions arose about the optimal design of financial stability institutions and how to implement macroprudential policies in a credible way throughout the cycle. Although the crisis left Asia relatively unscathed, Asian countries were already leading the way regarding the best ways to deploy macroprudential policies.

Many Asian countries timely recognized that a single tool is unlikely to be sufficient to address the various sources of systemic risk. In their work on implementation issues, macroprudential authorities in the region tailored specific macroprudential instruments to particular vulnerabilities, including tools such as countercyclical capital buffers, variations in sector risk weights, dynamic provisioning, loan-to-value ratios, targeted restrictions on foreign currency lending, and liquidity requirements. Recognizing the importance of individual systemically important financial institutions (SIFI) and the systemic risk they convey, several jurisdictions in Asia even considered applying higher capital requirements on SIFIs to mitigate the risks of their potential failure.

Although we are still at an early stage of implementation, many lessons can be derived from practice. Three crucial factors seem to be at the root of any successful policy implementation on the macroprudential front:

- building a sound institutional framework by effectively identifying risks, providing incentives to take action in a timely manner to confront the arising risks, and facilitating the coordination of policies that affect systemic risk;
- designing an analytical framework to monitor and assess systemic risk; and
- establishing a system of international cooperation based on the recognized interconnectedness of financial crises.

Two main themes across the many countries covered in the book should be underlined:

- Macroprudential policy should focus on risks arising primarily within the financial system, or risks amplified by the financial system.
- Macroprudential policy is not intended to address financial stability risks associated with macroeconomic imbalances and shocks, or inappropriate macroeconomic or structural policies—for which the first line of defense should be adjustments in macroeconomic policies.

Moreover, critically important questions still include the following:

- Do particular frameworks for financial stability institutions carry certain advantages in managing systemic risk and adjusting macroprudential policies, especially in such a volatile global environment?
- How should macroprudential policies be coordinated with monetary and fiscal policies? How do countries ensure that macroprudential policies work in concert with credible frameworks for monetary and fiscal policy?
- Which macroprudential instruments tend to be the most effective in containing systemic risk? Do countries have useful metrics for measuring systemic risk and for assessing the effectiveness of macroprudential tools?
- Are rules-based macroprudential policies more effective than those applied with discretion? When are single instruments more effective and when should a country rely on multiple instruments?

Answers to these questions are yet to be found. In the meantime, this book advances an excellent array of experiences from 13 countries in Asia and from some other latitudes as well—including Latin America and Israel—on these complex issues. We hope you will find this book insightful and a source of motivation to undertake further research on macroprudential tools and the institutional frameworks that can ensure their effective and timely deployment.

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All the views expressed in this book are those of the respective authors and should not be interpreted as those of the International Monetary Fund.

Introduction

RODOLFO MAINO AND STEVE BARNETT

The 2008–09 global financial crisis has placed Asia in a unique position. In the transformation of the global economy, Asia has been an economic powerhouse, standing at the helm of the global recovery.

Asian economies managed to construct suitable macroprudential frameworks to contain the procyclicality of their financial systems and avoid the emergence of financial weaknesses and vulnerabilities. Asian macroprudential instruments and policies were used to complement the deployment of traditional macroeconomic policies to confront easy external financing conditions that were conducive to asset-price bubbles and credit exuberance. By dealing with the intersection of the real economy and the financial sector, macroprudential policies are becoming increasingly central, both in shifting the world out of the crisis and in preserving a stable environment to move toward stronger sources of growth.

The Macroprudential Angle

It is now broadly accepted that macroprudential policy should primarily address risks arising in the financial system and risks amplified by the financial system, leaving other identified sources of systemic risk to be dealt with by other public policies. Thus, a macroprudential strategy complements but cannot substitute for sound microprudential and macroeconomic policies. A macroprudential policy that is well coordinated with macroeconomic policies tends to be more effective in addressing systemic risk. Furthermore, macroprudential policy is better suited for targeting specific sectors, and should be used primarily to increase the resilience of the financial system.

During the crisis, policymakers felt the urgency of building up a new macroprudential framework. And Asia led by example. Asian countries

understood that capital flows presented a great opportunity for economic development and investment and growth but they equally entailed significant challenges, such as exchange rate overshooting, credit booms, asset-price bubbles, and financial instability.

Timely detection of systemic risks—through market intelligence, information, and supervision—is of the essence for a pragmatic approach to financial stability (Nishimura, 2011). The Bank of Japan, for instance, has made efforts to use market intelligence to identify signs of risk accumulation. These efforts were complemented with regular comprehensive risk assessments of the overall financial system (by means of financial system reports) macro stress testing, and an innovative system of financial cycle indexes, which are designed as early warning indicators. These indices, which are based on traditional economic trends and cycles, have been useful for macroprudential policy design in Japan because they provide early warnings of the accumulation of risks.

The chapters in this volume review policy tools and frameworks deployed by policymakers from Asia and the Pacific and draw lessons for the use of macroprudential policies. Macroprudential policy aims to support monetary policy objectives, safeguard the financial system, and limit financial sector systemic risk. Many Asian economies have been proactive in deploying macroprudential tools; therefore, it is particularly useful to study the experiences in the region. In particular, the book advances a better understanding of the interplay of macro- and microprudential tools with conventional monetary policy implementation, both in crises and normal times. It covers systemic risk identification and monitoring (with models and indicators), macroprudential instruments (what works better under specific circumstances), and institutional setup (who does what, and how to ensure accountability and coordination).

The IMF's Work

The IMF has also understood the challenge of appropriately and timely addressing these vulnerabilities.¹ In particular, the IMF is currently aiming at achieving a common understanding of the role of macroprudential policy in a broader public policy framework and guiding its membership on the design and implementation of macroprudential policy frameworks. Practical guidelines for putting macroprudential policies into operation have been recommended by the IMF, and include the following:²

¹ Other notable work summarizing macroprudential policy includes Bank of England (2011) and Hahn and others (2012).

² IMF (2011), in a chapter entitled “Toward Operationalizing Macroprudential Policies: When to Act” aimed to help policymakers to better diagnose systemic risk buildup and test the usefulness of indicators in predicting financial crises. The chapter illustrated how countercyclical capital requirements would operate—by accumulating capital when risks are building and drawing down this capital in a downturn.

- Distinguishing good shocks (such as productivity gains) from bad ones (asset-price bubbles) is critical to avoid squashing healthy economic growth.
- Credit and asset-price growth provide powerful signals of systemic risk buildup.
- Using a combination of the LIBOR-OIS spread (difference between the London Interbank Offered Rate and the overnight indexed swap rate) and the yield curve could provide a signal of an imminent crisis.
- Understanding the source of the shock is critical to being able to choose the correct set of macroprudential policy tools.
- Macroprudential and monetary policies need to be deployed with an understanding of the basic source of shocks.

An IMF working paper reviewed cross-country experiences in choosing and applying macroprudential instruments (Lim and others, 2011). Stressing that different types of risks call for the use of different instruments, the paper found that the following instruments may help dampen procyclicality: caps on the loan-to value ratio, caps on the debt-to-income ratio, ceilings on credit or credit growth, reserve requirements, countercyclical capital requirements, and time-varying or dynamic provisioning. In addition, limits on net open currency positions and currency mismatches and limits on maturity mismatches may help reduce common exposures across institutions and markets (Table 1).³

Table 1. The Conceptual Basis of Macroprudential Instruments

Instrument	Conceptual Basis
Caps on the loan-to-value (LTV) ratio	The LTV ratio imposes a down payment constraint on households' capacity to borrow. In theory, the constraint limits the procyclicality of collateralized lending because housing prices and households' capacity to borrow based on the collateralized value of the house interact in a procyclical way. Set at an appropriate level, the LTV ratio addresses systemic risk regardless of whether it is frequently adjusted. However, the adjustment of the LTV ratio makes it a more potent countercyclical policy instrument.
Caps on the debt-to-income (DTI) ratio	The DTI ratio represents prudential regulation aimed at ensuring banks' asset quality when used alone. When used in conjunction with the LTV ratio, however, the DTI ratio can help further dampen the cyclicity of collateralized lending by adding another constraint on households' capacity to borrow. Like in the LTV ratio, adjustments in the DTI ratio can be made in a countercyclical manner to address the time dimension of systemic risk.

(Continued)

³ Further international guidance can be found in FSB, IMF, and BIS (2011) and BIS (2010).

Table 1. (Continued)

Instrument	Conceptual Basis
Caps on foreign currency lending	Loans in foreign currency expose the unhedged borrower to foreign exchange risks, which, in turn, subject the lender to credit risks. The risks can become systemic if the common exposure is large. Caps (or higher risk weights, deposit requirements, or the like) on foreign currency lending may be used to address this foreign-exchange-induced systemic risk.
Ceilings on credit or credit growth	A ceiling may be imposed on either total bank lending or credit to a specific sector. The ceiling on aggregate credit or credit growth may be used to dampen the credit and asset-price cycle—the time dimension of systemic risk. The ceiling on credit to a specific sector, such as real estate, may be used to contain a specific type of asset-price inflation or limit common exposure to a specific risk—the cross-sectional dimension of systemic risk.
Limits on net open currency positions or currency mismatches	Such prudential regulation tools limit banks' common exposure to foreign currency risks. In addition, the limits may be used to address an externality—sharp exchange rate fluctuations caused by a convergence of purchases and sales of foreign exchange by banks. This externality increases the credit risk of unhedged borrowers with heavy foreign currency debt.
Limits on maturity mismatch	These prudential regulation tools may be used to address systemic risk because the choice of asset and liability maturity creates an externality—fire sales of assets. In a crisis, the inability of a financial institution to meet its short-term obligations because of maturity mismatches may force it to liquidate assets, thus imposing a fire sale cost on the rest of the financial system. The funding shortages of a few institutions could also result in a systemic liquidity crisis due to the contagion effect.
Reserve requirements	This monetary policy tool may be used to address systemic risk in two senses. First, the reserve requirement has a direct impact on credit growth, so it may be used to dampen the credit and asset-price cycle—the time dimension of systemic risk; second, the required reserves provide a liquidity cushion that may be used to alleviate a systemic liquidity crunch when the situation warrants.
Countercyclical capital requirement	The requirement can take the form of a ratio or risk weights raised during an upturn as a restraint on credit expansion and reduced during a downturn to provide a cushion so that banks do not reduce assets to meet the capital requirement. A permanent capital buffer, which is built up during an upturn and drawn down during a downturn, serves the same purpose. Both can address the cyclicity in risk weights under Basel II based on external ratings that are procyclical.
Time-varying or dynamic provisioning	Traditional dynamic provisioning is calibrated on historical bank-specific losses, but it can also be used to dampen the cyclicity in the financial system. The provisioning requirement can be raised during an upturn to build a buffer and limit credit expansion and lowered during a downturn to support bank lending. It may be adjusted either according to a fixed formula or at the discretion of the policymaker to affect banks' lending behavior in a countercyclical manner.
Restrictions on profit distribution	These prudential regulation requirements are intended to ensure the capital adequacy of banks. Because undistributed profits are added to bank capital, the restrictions tend to have a countercyclical effect on bank lending if used in a downturn. The capital conservation buffer of Basel III has a similar role.

Source: Lim and others, 2011.

Furthermore, because no single macroprudential instrument can deal with and respond to all aspects of systemic risk, a set of instruments must be used in combination with one another and in a complementary fashion with other macroeconomic policies. Calibration of these instruments requires a thorough technical answer before they are deployed, including potential trade-offs and costs of implementing these policies.

“One size does not fit all” because arrangements need to incorporate local idiosyncratic conditions. Policies sometimes address specific areas or sectors, such as housing, and sometimes must deal with specific risks, such as credit or liquidity risks. Nier and others (2011) assesses the strengths and weaknesses of existing and emerging institutional models for macroprudential policy and provides broad guidance for institutional arrangements to support macroprudential policies in advanced and emerging market countries. The paper advanced a set of desirables to ensure broad consistency in IMF advice (Box 1).⁴

Box 1. Key Desirables for Macroprudential Policy Arrangements

General

1. The central bank should play an important role in macroprudential policymaking.
2. Complex and fragmented regulatory structures are unlikely to be conducive to successful mitigation of systemic risk and should therefore be avoided.
3. Participation of the treasury in the policy process is useful, but a leading role poses risks.
4. Systemic risk prevention and crisis management are different policy functions that should be supported by separate organizational arrangements.
5. A macroprudential policy framework should not become a vehicle for compromising the autonomy of other established policies.
6. Arrangements need to take account of country-specific circumstances.

Provide for Effective Identification, Analysis, and Monitoring of Systemic Risk

7. Mechanisms for effective sharing of all information needed to assess systemic risks should be in place.
8. At least one institution involved in assessing systemic risk should have access to all relevant data and information. It should have the best existing expertise at its disposal to assess systemic risk.
9. Mechanisms are needed to challenge dominant views of one institution.

⁴ A review of policy tools used by Latin American policymakers can be found in Terrier and others (2011).

Box 1. (Concluded)

Provide for timely and effective use of macroprudential policy tools

10. Institutional mechanisms should support willingness to act against the buildup of systemic risk and reduce the risk of delay in policy actions.
11. A lead macroprudential authority should be identified and be provided with a clear mandate and powers, in a manner that harnesses the incentives of existing institutions to mitigate systemic risk.
12. The mandate needs to be matched by sufficient powers, including to initiate the use of prudential tools to address systemic risk. Mechanisms should be established to expand powers when needed.
13. The mandate should give primacy to the mitigation of systemic risk, but include secondary objectives to ensure that the policymaker takes into account costs and trade-offs.
14. To guard against overly restrictive or inadequate policy, proper accountability and transparency need to be put in place, without unduly compromising the effectiveness of macroprudential policy.

Provide for effective coordination across policies to address systemic risk

15. Institutional integration of financial regulatory functions within the central bank can support effective coordination of macroprudential policy with monetary as well as microprudential policy, but also requires safeguards.
16. Where institutional separation of policy decisions and control over policy tools cannot be avoided, the legal framework needs to assign formal powers to recommend or direct action of other policymakers.
17. Where there is distributed decision making among several agencies, establishing a coordinating committee is useful, but may not necessarily be sufficient to overcome collective action and accountability problems.

Overview

This book shows a committed quest by authorities in Asia to mitigate risks for central bank market operations stemming from short-term capital inflows and to reduce risks affecting both the real economy and the banking system. The book covers a wide range of topics on macroprudential policy.

Chapter 1 deals with the institutional need for setting an optimal macroprudential arrangement. The chapter also presents some practical examples of institutional frameworks—in the Philippines and Mongolia—

for financial stability that supports the development of a macroprudential policy function, including institutional boundaries between central banks and financial regulatory agencies and dedicated policymaking committees.

- Jacek Osinski underlines that countries' unique circumstances are critical to the consolidation of a macroprudential policy framework, among them, institutional factors (quality of existing institutional arrangements, legal traditions), political economy considerations (attitude toward concentration of political power), cultural issues, and resource availability.
- Johnny Ravalo emphasizes that in the Philippines, the central bank aims to achieve financial stability by binding macroprudential, monetary, financial, infrastructure, and fiscal policies so that the systemic implications of transaction-level risks can be understood. He also warns of the need to have sharper tools, a harmonized view of managing and mitigating financial risks, and a commitment to cooperation and coordination to move forward effectively.
- Recognizing that Mongolia's economy is highly dependent on a few commodities and, thus, very vulnerable to procyclicality, Byadran Lkhagvasuren presents a case for adopting dynamic provisioning, provisioning on normal loans, caps on foreign currency lending, credit limits by economic sector, and time-varying capital requirements, although the approach requires regulators and policymakers to reconsider laws, codes, and regulations related to accounting and reporting.

Chapter 2 presents examples of how some countries—Thailand, Hong Kong SAR, Indonesia, and Singapore—incorporate macroprudential instruments into monetary policy design, addressing alternative ways to formulate and effectively implement an optimal integration. The cases of Israel and Peru add additional background on the extent of substitutability in meeting the objectives of monetary and macroprudential policies.

- Chayawadee Chai-anant illustrates the challenges for the Bank of Thailand in deploying macroprudential policy to address sectoral imbalances and in aligning monetary policy and microprudential regulation. The set of policies considered by the Bank of Thailand included tightened regulation of credit card loans and personal loans, parameters for net foreign exchange positions, loan-to-value ratios on mortgage loans, loan-loss provisioning, and a withholding tax.
- In Hong Kong SAR, inflationary pressures and the increase in residential property prices raised concerns about the risk of credit-asset-price spirals. Against this background, Choi-Hoi Hui writes that the authorities put special emphasis on timely implementation of loan-to-value limits

complemented by a special requirement for banks to hold regulatory reserves against latent credit risk.

- In Indonesia, the post–global crisis era demands a strengthening of the monetary policy framework. Juda Agung argues that issues of procyclicality warrant an integration of monetary and macroprudential tools for countercyclical purposes with the aim of maintaining both price stability and financial stability.
- This view is also supported by Barry Topf who, advancing valuable experience from Israel, states that macroprudential policy should be viewed in a broad context, tying together the two key goals of a central bank: price stability and financial stability.
- The Singaporean experience outlines a clear example of targeted macroprudential responses. Ng Chuin Hwei explains how the deployment of macroprudential toolkits has focused on the housing market given the systemic risks transmitted through the credit and leverage risk channel and the asset-price inflation risk channel.
- Presenting a valuable extraregional experience on the use of macroprudential instruments under dollarization, Renso Rossini emphasizes that the institutional macroprudential framework in Peru is not based in a formal mandate, but in coordination meetings to review risks and take actions to control them. Because of the partially dollarized financial system in Peru, the central bank relies on quantitative instruments to respond to early indicators of substantial and autonomous movements of liquidity and credit, which may generate systemic risks.

Chapter 3 begins with Rodolfo Maino’s review of critical issues associated with measuring systemic risks. The chapter also appraises key elements pertaining to the implementation and deployment of macroprudential policies in the Republic of Korea, India, New Zealand, Bangalore, China, Cambodia, Indonesia, and Sri Lanka. Specifically, the chapter addresses the role of macroprudential policies in mitigating systemic risks and the need for enhanced cooperation and coordination, both domestically and internationally. Systemic risk is multidimensional and difficult to identify and measure, so effective macroprudential policymaking depends on filling information gaps and on effective coordination between macroprudential policy and other public policies. This coordination can be difficult in practice and needs to be coupled with mechanisms to avoid macroprudential policy being used as an inappropriate substitute for other public policies, especially monetary policy. Cross-border systemic risks and regulatory arbitrage underscore the critical importance of effective international coordination in identifying and measuring systemic risks.

- Jun Il Kim underlines that real sector–financial sector linkages and cross-border connections suggest that a measurement of systemic risk should be able to capture the notion of interconnectedness and the complex interplay among market participants. In this regard, the Bank of Korea is addressing correlated risks and risk mismatches in various dimensions.
- The use of time-varying risk weights and provisioning norms is also commonplace in India. Rabi N. Mishra illustrates the effective cooperation between regulators and the Reserve Bank of India with an analysis of interconnectedness between banks and other financial institutions in dealing with common and large exposures, capital movements, and other challenges to curb exuberance in specific areas and targeted sectors.
- In countries like New Zealand, there is no compelling case for using macroprudential tools to address buildups in systemic risk or emerging financial vulnerabilities. However, Chris Hunt warns about the need to lay the groundwork for macroprudential policy and to pre-position the new instruments for when the next credit and asset-price boom occurs. To address the key risk represented by the unavailability of funding, New Zealand introduced a new liquidity policy focused on the core funding ratio, which defines a minimum level of stable funding to which banks must adhere.
- The case of Bangladesh, summarized by S.K. Sur Chowdhury, shows a clear prioritization of fiscal and monetary policies amid a comprehensive macroprudential approach, dealing with foreign exchange market measures and supervisory oversight of risk-management practices.
- Liao Min gauges the use of supervisory measures in China from a macroprudential perspective along with countercyclical measures adopted during phases of the economic cycle. In particular, he underlines how critical the process of formulating the policy framework for systemically important financial institutions has become in recent years.
- Buy Bonnang Pal reflects on his views of the challenges and difficulties for Cambodia in articulating a collaborative effort among regulators for devising an effective macroprudential framework.
- Increases in capital flow volatility and household debt are potential sources of systemic risk confronting Korea. These systemic risk factors in Korea have implications for procyclicality and expose the economy to systemic risk in the time dimension more than in the cross-sectional dimension. Tae Soo Kang describes how the Bank of Korea has

deployed macroprudential measures, including dynamic provisioning, in recent years to address these risks.

- Sukarela Batunanggar describes the four strategies Bank Indonesia has adopted to achieve a stable financial system, comprising microprudential supervision, macroprudential supervision, coordination and cooperation, and crisis management.
- The analytical framework for monitoring and controlling systemic risk in Sri Lanka seeks to cover both the time dimension (dealing with credit cycles and procyclicality of the financial system) and the cross-sectional dimension (focusing on interlinkages and common exposures between financial institutions). Kumudhini Saravanamuttu summarizes Sri Lanka's efforts to address these risks and to deploy macroprudential instruments in a timely manner.

Good timing and the appropriate use of policy instruments are essential for dealing with any crisis. They are even more critical for preventing disruptions. To manage the procyclicality of financial systems, countries have numerous policy options in their toolkits—lower interest rates, reserves accumulation, tighter fiscal policy, macroprudential measures, and sometimes even capital controls. The appropriate answer always depends on the special circumstances at hand—there is no one-size-fits-all solution for addressing systemic risk. In the next pages, Asian countries are advancing examples of how to merge conventional macroeconomic policies and macroprudential tools to address the critical dual issues of price and financial stability. These efforts include building up an effective institutional framework, developing robust analytical toolkits, and closing information gaps. In the aftermath of the severe financial crisis of 2008–09, the Asian experience with the use of macroprudential toolkits is worth reviewing.

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Abbreviations

BI	Bank Indonesia
BIS	Bank for International Settlements
BSP	Bangko Sentral ng Pilipinas (Central Bank of the Philippines)
CBRC	China Banking Regulatory Commission
CBSL	Central Bank of Sri Lanka
CPI	consumer price index
DTI	debt to income
FSB	Financial Stability Board
FSCC	Financial System Stability Committee
GDP	gross domestic product
HKMA	Hong Kong Monetary Authority
IB	Bank of Indonesia
IFR	investment fluctuation reserve
IMF	International Monetary Fund
LTV	loan to value
NBC	National Bank of Cambodia
NBFCs	nonbanking financial companies
PBC	People's Bank of China
SAR	Special Administrative Region
SIB	systemically important bank
SIFI	systemically important financial institution

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Institutional Needs for Optimal Macroprudential Arrangements

Institutional Arrangements for Macroprudential Policy

JACEK OSIŃSKI

This introductory section addresses three issues:

- What are the defining elements of macroprudential policy and what is its role?
- Which institutions and bodies now hold the macroprudential mandate and relevant responsibilities?
- What are the key desirables of macroprudential policy arrangements and how do different models meet them?

Elements Defining Macroprudential Policy

Views still differ on what macroprudential policy is. For instance, clearly delineating micro- and macroprudential policies, which is important for assigning the responsibilities to particular institutions, is difficult. The prevailing view is that macroprudential policy should be seen as a complement to microprudential policy.

Yet, views vary as to whether macroprudential policy should be regarded as a particular perspective of prudential policy or as a new policy area in its own right (filling a gap between microprudential and monetary policies). At one end of the spectrum, some argue that prudential policy, as carried out in the past, already had some macroprudential aspects, and that the 2008–09 global economic and financial crisis has reinforced this orientation. In this case, “micro” and “macro” can be seen as tensions between perspectives regarding the use of prudential instruments that will need to be managed.

At the other end of the spectrum, many emphasize that the philosophies behind micro- and macroprudential policies are fundamentally different, with the latter focusing more on interactions with the rest of the economy and macroeconomic policies, possibly also involving the use of nonprudential tools, and requiring a different type of expertise. This would indicate that macroprudential policy should be regarded as a different kind of public policy, rather than as an add-on to microprudential policy.

Notwithstanding these differences, the emerging consensus seems to suggest that the objective of macroprudential policy is to identify, monitor, and limit systemic or system-wide financial risk in both time and cross-sectional dimensions. Its analysis should cover all potential sources of systemic risk regardless of from where they emerge. Macroprudential policy should focus on risks arising primarily within the financial system, or risks amplified by the financial system, leaving other identified sources of systemic risk to be dealt with by other public policies. Its toolkit consists mainly of prudential-type instruments that form the core, constructed or calibrated to deal specifically with systemic risk. However, other instruments can be added, if they explicitly and specifically target systemic risk and if they are placed at the disposal of an authority with a clear macroprudential mandate, accountability, and operational independence. They can be both the tools under direct control of the institution or body assigned the macroprudential function and the tools influenced indirectly through recommendations to activate or change their calibration. The latter can be other policies' tools needed to address identified systemic risks residing in other policies' domains. In activating them, a balance must be struck between the effectiveness of the policy for macroprudential purposes and the need to preserve the autonomy of other established policies.

Who Holds the Macroprudential Mandate in Practice?

The survey of 63 countries carried out by the IMF at the end of 2010 showed that in 88 percent of those countries, some institution has a financial stability mandate; 43 percent of countries also signaled they had institutions with a macroprudential policy mandate. The mandates were both explicit and implicit; few countries have explicit mandates embedded in the law. Central banks seem to play an important role in this policy area, having been appointed as holders of macroprudential mandates most frequently. The responses indicated that central banks play a dominant role in all aspects of macroprudential policymaking: risk identification, systemic impact assessments, decisions to take action, implementation, and enforcement. They were most frequently cited as the lead institutions or coordinators (financial stability committees were the second-most frequently mentioned). Central banks were also cited as the lead institutions or coordinators for reporting to the executive or to parliament.

Who Should Hold the Macroprudential Mandate?

Establishing a well-functioning institutional framework for macroprudential policy is a precondition to effective policymaking. “Real-life” institutional models for macroprudential policies are new and emerging. Hence, it is difficult to assess the effectiveness of these models empirically. To overcome this problem, an analysis was made of to whom to assign the mandate and the powers, given the characteristics of the policy itself (as already defined). “Stylized” institutional models were identified for macroprudential policies, drawing on existing financial stability frameworks, and in light of key dimensions that differentiate them. The strengths and weaknesses of these models were assessed conceptually, based upon criteria that seem to be important for successful mitigation of systemic risks.

Contrary to previous attempts (BIS, 2011) in which the model is defined by who holds the mandate, a broader approach was taken (Nier and others, 2011), and five criteria were applied to differentiate them: the degree of institutional integration between the central bank and supervisory agencies; ownership of the macroprudential policy mandate; the role of the government; the degree of separation between policy decisions and control over instruments; and the existence of a separate body coordinating policy decisions.

Three basic criteria were defined to assess the models. Because a desirable institutional model should be conducive to the mitigation of systemic risk, it should provide for (1) the effective identification, analysis, and monitoring of systemic risk, which requires access to relevant information and the appropriate resources and expertise to use the information; (2) the timely and effective use of macroprudential policy tools, which requires a strong mandate and powers combined with the ability and willingness to act preemptively as well as strong accountability; and (3) effective coordination across policies that aim to address systemic risk, to reduce gaps and overlaps.

Suitability of Different Models

By applying the above criteria to the stylized models, the following conclusions are reached:

- *All models have strengths and weaknesses, but not all models appear equally supportive of effective macroprudential policymaking.* Additional mechanisms can be used to address the potential weaknesses, which can ease or sometimes even eliminate them.
- *All relevant institutions should be involved in macroprudential policymaking.* The identification and reduction of systemic risk is a challenging public policy area. Systemic risk is fluid; it evolves over time and has multifaceted

manifestations, requiring the monitoring and comprehensive analysis of large amounts of quantitative and qualitative information, and various instruments assigned to different authorities. The involvement of supervisors, central banks, and government, at a minimum, is indispensable.

- *The central bank should play a prominent role in every model.* Central banks have good knowledge of the economy as a whole, which is important for any macroprudential decision maker because the interactions of the financial system with the real sector play an important role in macroprudential analysis. Central banks usually have developed systemic analyses of financial systems to perform their financial stability functions. They are active in the nonregulated markets on a day-to-day basis. They generally have the advanced research capabilities that are needed for modeling the policy or for the analysis of financial innovations in the context of systemic risk. They are independent of the political cycle and have a high propensity for preemptive action because it is costly for them to clean up once the systemic risk evolves into a crisis. Central banks have experience in communicating risk, setting them apart from, for example, supervisory agencies.
- *Participation by the treasury in the policy process is useful, but a leading role for the treasury may pose risks.* Even though the government of each country is ultimately responsible for its economic outcome, the government should not lead macroprudential policy. The key arguments are twofold: governments usually have no expertise in such complex issues, and at times political economy considerations make it difficult for government to set the necessary macroprudential parameters (an argument that is also relevant for monetary policy). However, the government should be involved in policymaking; it should understand the process well so it can request new powers from parliament for the macroprudential decision maker if there were to be regulatory or cross-border arbitrage.
- *Systemic risk prevention and crisis management are different policy functions and should be supported by separate organizational arrangements.* However, there is no doubt that the government has to lead the crisis-management process, especially if it involves spending public money. Thus, assigning different roles to different authorities in different processes requires that they be organizationally separate.
- *Fragmentation of responsibility between institutions should be avoided, but if it is necessary, should be compensated for with appropriate coordination mechanisms.* The result of fragmentation of responsibility may be that some important systemic risks will fall between the cracks and stay

unaddressed. The greater the number of institutions involved, the stronger the need for effective cooperation and coordination arrangements.

- *At least one institution involved in assessing systemic risk should have access to all relevant data and information.* The assessment of systemic risk is a complex task involving many sources of data and information. Shared analysis may not be an optimal solution.
- *Institutional mechanisms should support the willingness to act against the buildup of systemic risk and reduce the risk of delay in policy actions.* The 2008–09 financial crisis revealed a strong bias toward inaction due to difficulties in the identification and assessment of systemic risk. Even if risks are identified, authorities may not take timely action if they have other conflicting objectives. Thus, it is important to set up mechanisms in advance that support action (the choice of leading institutions, governance arrangements, communication policy, and so forth).
- *A lead macroprudential authority should be identified, vested with the necessary mandate and powers, and subject to formal accountability.* If fragmentation of institutions involved in macroprudential policy cannot be avoided, the appointment of a lead institution, which will formally be accountable for the effectiveness of the process, is sensible. Common responsibility, under which addressing systemic risk is no one’s prime responsibility, can be less effective.
- *Macroprudential policy frameworks should not compromise the autonomy of other established policies.* They should not be used as a “Trojan horse” to compromise the goals of other policies (monetary, microprudential). However, to ensure the effectiveness of the overall policy process, it is important to recognize what “autonomy” means and from whom it is important to be preserved.

These general conclusions for the setup of macroprudential policy are not the only elements that should be taken into account when devising the framework. Countries’ specific circumstances are also important, such as institutional factors (the quality of existing institutional arrangements, legal traditions), political economy considerations (attitude toward concentration of political power), and cultural issues, as well as the availability of resources (which, for example, have allowed the United States to establish an Office of Financial Research, whereas such resources may not be available in other countries). Finally, it should still be remembered that one size does not fit all.

Challenges of Executing a Financial Stability Policy Objective at the Central Bank of the Philippines

JOHNNY NOE E. RAVALO

Financial crises have always brought with them both hard socioeconomic dislocations and a set of identified policy lessons. During the 1997 Asian financial crisis, the most highlighted issue was the mismatch of maturity and tenor in the loans made by banks and how this mismatch created havoc in the real economy. In the global financial difficulties following the 2008–09 crisis, financial stability has clearly been the primary concern.

The term financial stability is not a product of the recent crisis. Substantive literature dating back to at least 1997 addresses the issue.¹ However, there is clearly something new about the current emphasis on financial stability. The absence of an accepted universal definition for what constitutes financial stability has not hindered its overall pursuit. Most reform initiatives today—from the Basel Accords to governance to regional integration—are, in fact, explicitly premised on achieving financial stability.

The Context of Financial Stability

Definitions aside, effective macroprudential policies are widely understood to be a prerequisite to achieving financial stability. As noted in FSB, IMF, and BIS (2011), macroprudential policies are broadly meant to dampen the buildup of financial imbalances, contain the impact of downswings, and address common sources of contagion.

Straightforward as the idea may be, a number of technical details are often overlooked in the discussions. Toward this end, a report issued by a BIS working group highlighted the need for nuanced analytical capabilities in executing the macroprudential task (BIS, 2011). In particular, the report argues that

- Macroprudential policy is not simply the summation of microprudential concerns;
- The covariances between risk positions are just as important as the respective positions themselves; and
- Contagion and spillover effects cannot be properly evaluated by simply looking at the individual components alone.

¹ See, for example, Crockett (1997), Davis (2001), and Schinasi (2004). Ravaló (2010) also provides a review.

These concepts restate a point that is cited by risk technicians but sometimes forgotten in policy discussions: the financial system is a network of nonlinear relationships because financial risks are nonadditive and nonseparable. The implication is that financial stability is a different policy issue even if macroeconomic theory, monetary policy, the regulation of financial institutions, fiscal policy, and financial market infrastructure are understood separately. Thus, the BIS report puts forward the conclusion that a “complete range of instruments uniquely oriented to macroprudential policy has not yet been developed, let alone deployed” (BIS, 2011, p. 47).

The Central Bank of the Philippines’ View of Financial Stability and Macroprudential Policy

The Central Bank of the Philippines (Bangko Sentral ng Pilipinas, or BSP) subscribes to the nuanced view of financial stability and macroprudential policy described above. Despite the well-developed framework for macroeconomic theory, monetary policy, the regulation of financial institutions, fiscal policy, and financial market infrastructure were not enough to provide a full appreciation of the underlying pressures that evolved into the crisis. Discounting for the surprises that arise from information asymmetries, it can be argued that the policy objective of financial stability in its present form is entirely new. With it, a new understanding of financial risks is needed if we are to mitigate systemic instability.

In putting in place a financial stability framework at BSP, it is recognized that a holistic view is warranted. This is not merely convenient rhetoric. Rather, it is an acknowledgment that although financial linkages may start from retail transactions, the linkages will coalesce into a system-wide effect that will always have a feedback loop back into micro agents.²

BSP accepts that financial markets are inherently risky. The objective, though, is not the elimination of all financial risks because managing those risks deemed acceptable is central to the value proposition of financial markets. Furthermore, financial risks are not independent of each other even though prudential oversight treats risks separately in practice.

From a comprehensive standpoint, the macroprudential task is not limited to identifying the different risks or institutionalizing the appropriate risk mitigants. Instead, it requires that an understanding be developed of how different risks come together. This gives the macroprudential policymaker an appreciation for the

² This can be demonstrated, for example, with bank reserve policy. By containing the creation of liquidity among banks, we likewise create the same high-powered money that feeds into the real economy. As profits are made from economic activity, some of the cash flows return to micro agents as savings, which then get retransmitted into bank deposits subject to reserves, creating the next round of micro-to-macro-to-micro loop.

linkages that develop once transactions are triggered. This is the necessary condition that must be met for macroprudential analysis. However, it is not sufficient because the path that comingled risks take in evolving from transaction-level risks to system-wide risks must also be understood.

The above discussion summarizes the key principles that BSP espouses on financial stability. They are not conjectures because they are, in fact, demonstrable by basic portfolio theory. In a two-asset portfolio, portfolio risk as measured by the variance of the portfolio's returns, σ_p^2 , is defined as

$$\sigma_p^2 = \omega_A^2 \sigma_A^2 + \omega_B^2 \sigma_B^2 + 2\rho_{AB} \omega_A \sigma_A \omega_B \sigma_B, \quad (1.1)$$

in which σ_i^2 is the stand-alone risk measure for the i th asset ($I = A, B$), ρ_{AB} is the correlation coefficient between assets A and B , and ω_i is the portfolio allocation for the i th asset.

The above equation highlights the point that systemic risk is a nonlinear, nonadditive, nonseparable function of the risks of the component assets. However, this point was as much true in the 1950s when Markowitz proposed the portfolio theory framework as it is today. Thus, although the case can be made that markets are now more volatile, it also should not be forgotten that the decomposition of system (portfolio) risks has not really changed despite the added complexities in the market.

The same basic equation is useful in highlighting another key point. Representing “monetary policy” as asset A and “financial institution supervision” as asset B provides a convenient expression for identifying the components that delimit financial stability concerns. In particular, systemic risk may arise for microprudential reasons. If the microprudential reasons are to remain within the domain of the microprudential regulator, then these sources of systemic risk do not automatically constitute a case for macroprudential policy intervention. Under this framework of policy separation, the covariances that go into the pairwise relationships ρ_{ij} and $\forall i$ and j play a critical role. Any shock that goes through ρ_{ij} is definitely a macroprudential issue because it is through these pairwise channels that transaction-level risks comingle and get transmitted through channels that subsequently evolve into systemic risk.

The Working Arrangements for Financial Stability in the BSP

The point of the above discussion is to serve as a reminder that specific policy objectives still have distinct roles to play, even in a financial stability–centric world. Macroprudential policy on its own does not substitute for monetary policy, prudential oversight, or the management of financial infrastructure. Yet it also points to the challenge of organizing for a financial stability policy objective.

Creating a High-Level Financial Stability Committee within the BSP

The organizational challenge was evident from the outset when the pursuit of financial stability began to be conceptualized as an objective for the BSP. The importance of financial stability as a proactive initiative was recognized despite the knowledge that financial stability is presently not explicit in the BSP charter. Toward this end, the Financial Stability Committee (FSComm) was created as a high-level internal body that would take steps to address the potential buildup of systemic pressures in conjunction with the explicit mandates that the BSP—as a monetary authority, bank regulator, and financial infrastructure provider—already pursues.³

The creation of the FSComm needs to be viewed in the context of the regular operations of the BSP. As an institution, the BSP operates in pursuit of three pillars: price stability, banking system stability, and a safe and reliable payment system. Each of these pillars is managed by a sector composed of line units that are staffed by full-time personnel. At the operational level, although there is a fair amount of interaction across sectors, there is mutual recognition of which sector takes the lead on any issue because the issues typically fall uniquely into their respective pillars.

The BSP established a working definition of financial stability:

Financial stability is achieved when the governance framework of the market and its financial infrastructure enable and ensure the smooth functioning of the financial system conducive to sustainable and equitable economic growth.

This definition explicitly targets financial governance (of both infrastructure and conduct), a functioning financial market, and high-quality economic growth. Clearly, then, cross-pollination of expertise and information across the BSP's three pillars is necessary. This cross-pollination will foster the formation of a holistic view within the BSP. It is also the basis for the appropriate crafting and implementation of the corresponding macroprudential policy actions.

Although the intent is clear, the challenge lies not in the pursuit of a new policy objective of financial stability but rather in merging existing mandates to achieve the goal of stability. Existing mandates are still to be pursued by existing responsible units and the new objective is to be executed by the same

³ The FSComm was created on September 14, 2010, under Office Order 0867. The committee is chaired by the BSP governor and includes six other members: the deputy governor for the Supervision and Examination Sector, the deputy governor for the Monetary Stability Sector, the deputy governor for the Resource Management Sector, the assistant governor for the Monetary Policy Sub-Sector, the assistant governor in charge of the Treasury Department, and the managing director of Supervision and Examination Sector, who also heads the technical committee.

existing responsible units. At the most basic level, this is an issue of time constraints because existing personnel already have full-time jobs.

However, situations will arise in which a desired action for one mandate may not be positive for all of the other mandates. These situations are the more binding constraints. They occur more frequently than otherwise thought, and the appropriate course of action needs to be determined against an objective that surpasses the original mandates.⁴ A case can be made that financial stability represents that higher objective, but at the same time it also points to the operating difficulties that personnel face when organizing for this new policy objective while operating under existing mandates.

And these coordination issues must be dealt with even though financial instability is more well defined than is financial stability. Thus, even as the BSP is defining the context within which it approaches financial stability, these coordination issues present parallel challenges that are no less daunting than defining the operating targets for stability.

Creation of the Financial Stability Coordination Council (FSCC)

In 2010, the creation of a voluntary interagency body specifically for financial stability was proposed and formally approved. This event elevates the issues to the national level because the policy objective is now a collective task of the Securities and Exchange Commission (SEC), the Insurance Commission (IC), the Philippine Deposit Insurance Corporation (PDIC), the BSP, and the Department of Finance in its capacity as the fiscal authority.

The creation of the FSCC neither supersedes nor negates the FSCComm of the BSP. A symbiotic relationship premised on complementary action between microprudential actions and macroprudential policy is envisioned, as is evident from the process that led to the creation of the FSCC itself.

Establishing the FSCC was an act of the Financial Sector Forum (FSF). Executing financial market regulation along traditional market classifications and functions, the FSF is a voluntary interagency body with membership from the SEC, IC, PDIC, and the BSP. Prudential issues commonly faced by the four agencies are discussed and acted upon through the FSF. Among the issues to surface since 2010 are the prudential oversight of entities that act in several markets and the system-wide risks that may no longer be confined to

⁴ Monetary policy concerns may require that the policy rate be increased as an appropriate policy response. This increase, however, will have a negative impact on banks that may not find suitable borrowers in risk-adjusted terms at the higher hurdle rates. Similarly, the operator of the payment system may introduce measures that will streamline operations, but the same improvements may require costly adjustments that may just be passed on to the retail consumers of banks.

any single supervisory authority. It was in this context that the coordinating body for financial stability was crafted, pulling together the four existing microprudential authorities and the fiscal authority.

At the time of this writing, the steering committee of the FSCC had already convened and identified its initial policy agenda. The agenda needs to be confirmed and approved by the Executive Committee of the FSCC, which was to have been convened shortly. Operationally, content and coordination issues similar to those presently faced by the BSP's FSComm are expected to be encountered.

An Aside on Stress Testing

Before leaving organizational issues, this section reverts to the issue of the still-missing macroprudential indicators specific to financial stability.

As pointed out in FSB, IMF, and BIS (2011, p. 2), “many policies could and should influence financial stability and systemic risk, but not all such policies should be considered macroprudential.” The operational challenge of this distinction is highlighted in BIS (2011), which states that “to date no instruments uniquely suited to macroprudential policy have been deployed” (p. 37). The recourse then is to deploy existing microprudential instruments for the purpose of financial stability.⁵

In pursuing a macroprudential objective, the BSP is focusing on five metrics. Four of these are works in progress: a financial computable general equilibrium model, contingent claims analysis, network modeling, and other valuation models. The one macroprudential metric that is already in place is the stress-testing exercise. Stress tests are also being used in other countries, however, the BSP has moved beyond the standard shocks, reflecting its recognition that risks always comeingle even if procedurally they are analyzed individually.

In this view, stress tests are most viable as indicators of pressure points if the framework allows for different stress points to be conceptually linked to each other. The BSP has devised a holistic stress-testing framework that highlights the linkages between variables and the sequence of potential effects.

Although the framework has been defined, another challenge has arisen that may not have been given due consideration. To execute stress tests, the full cooperation of covered institutions, banks in this particular case, is absolutely required. Different banks, however, will have different levels of efficiency in their backroom operations. This matters because the quality of the aggregated

⁵ The same point is made in BIS (2010).

stress tests depends on whether the regulator is comfortable with the quality of the individual tests from each bank.

Equivalent quality is not a given even for the standard tests segregated by risk types, that is, credit risk, market risk, and liquidity risk, among others. Work needs to be done to coordinate properly between the banks and the banking regulator, not only in the disposition of the stress tests but more so in the information that should actually go into the tests themselves. Before the BSP migrates to the more holistic stress tests, this coordination is required, even for the most basic of stress tests. In the absence of such coordination, the results of the aggregated stress tests suffer from questions of suitability and data integrity.

Working toward the Establishment of a Macroprudential Infrastructure

Markets have become increasingly interconnected and complex, making it necessary for economies to be more aware of and more focused on addressing financial stability matters. Financial stability requires the identification and implementation of macroprudential policies to manage systemic risks. Banking is about the management of risks and thus, addressing risks has always been its business. On a system-wide basis, however, no local regulator in the Philippines is yet focused on this.

The Bangko Sentral ng Pilipinas (BSP; the central bank of the Philippines) formally pursued the policy objective of financial stability in 2010. In September of that year, a high-level Financial Stability Committee (FSComm) was created to put in place a financial stability framework within the BSP. To address the need for collaborative efforts across policies, a Financial Stability Coordination Council (FSCC) was established in January 2011.

Organizational matters have been a challenge for the FSComm and the FSCC. Adopting a uniform understanding and establishing a work plan across departments and agencies were the first orders of business. The identification of macroprudential tools and models are also being undertaken.

It is recognized that establishing the appropriate infrastructure to support financial stability objectives is a complex, and perhaps even an overwhelming, task. The Philippines, however, has already begun the process.

The 2008–09 global economic and financial crisis demonstrated a crucial characteristic of the financial industry—the growing complexity and interconnectedness of its members. Since then, policy has focused more on strengthening regulation and supervision of the financial system as a whole while linking it to the macroeconomy. Economies began establishing their respective macroprudential infrastructures to manage financial stability.

Adopting Financial Stability as an Objective at BSP

In September 2010, the FSComm was created to establish a work plan for effecting a financial stability prudential policy framework and vision within the BSP, focusing on financial risks arising from the macroeconomy, payments and settlements, and the financial institutions under its supervision.

The FSComm is chaired by the governor of the BSP, and includes the deputy governors for the supervision and examination sector (SES), the monetary stability sector (MSS), and the resource management sector. BSP's assistant governors for the MSS and treasury departments and the managing director for the central supervisory support subsector of the SES are the other members of the FSComm, the latter of whom is also the head of the technical subcommittee.

The FSComm's work is spread throughout BSP's various departments given that members from all units are represented in the FSComm's three subcommittees—market monitoring, reports and communications, and quantitative and policy. The market monitoring subcommittee is the FSComm's daily monitoring arm for emerging local and global risks for stakeholders within the BSP. The reports and communications subcommittee is responsible for providing the appropriate financial stability documents and communicating them to other regulatory institutions throughout the archipelago. The quantitative and policy subcommittee is currently identifying appropriate financial stability models to be adopted by the FSComm and provides the policies to effect the FSComm's objectives.

Financial Stability as a Collaborative Effort

At the beginning of 2011, the pursuit of financial stability as a collaborative effort across regulatory agencies was furthered through the consideration of a discussion paper (Ravalo, 2011), expanding on an earlier paper prepared in 2010. This proposal was formally presented in a meeting held by the Financial Sector Forum (FSF) in January 2011.⁶ This was the opportune venue because the FSF involves the appropriate regulatory and policy agencies—the BSP, the Insurance Commission, the Securities and Exchange Commission, and the Philippine Deposit Insurance Corporation. Financial stability issues, however, extend beyond coordination and information sharing; thus, the formal body tasked to handle financial stability needed to be a distinct and separate platform from the FSF. In addition, the Department of Finance (DOF)

⁶ The FSF was created in 2004 to strengthen supervisory coordination and the exchange of information among the BSP, the Insurance Commission, the Securities and Exchange Commission, and the Philippine Deposit Insurance Corporation.

needed to become involved to embrace the influence of fiscal policies on financial stability. Thus, an “FSF Plus” was proposed. A year later, the proposed FSF Plus was established as the Financial Stability Coordination Council (FSCC). The mission of the FSCC was to design a technical work program to identify and mitigate the buildup of systemic risks as well as to institutionalize arrangements and processes during both normal times and periods of financial crisis. As may be warranted, the FSCC may also recommend to the legislature measures to improve the handling of financial stability.

The Next Challenge: Macroprudential Modeling

Developing an appreciation for a new and emerging framework for financial stability has been a challenge to Philippine financial regulators. Settling on the definition of financial stability in March 2010 amid varying interpretations was an endeavor.

Succeeding months were spent on organizational matters, establishing the subcommittees, outlining a work plan for the technical modeling, and defining the necessary output.

The FSComm is focusing now (mid-2012) on identifying the appropriate macroprudential tools for the Philippine setting. It is well known, however, that financial stability has long been an issue; thus, tools are already in place, albeit for the risk-management purposes of a more microprudential (banking oversight) objective. These tools mainly involve policy measures that handle interconnectedness, particularly credit exposures. The BSP has explicit guidelines for the management of large credit exposures to single individuals and entities. It also has supervisory rules on transactions and loans to connected parties and related interests. Under the purview of the FSF, a project on conglomerate mapping was established while other standard measures, such as loan-to-value ratios, provisioning, and real estate caps, have been in place for some time. In line with its implementation of the Basel III framework, the BSP is also introducing tools such as the capital conservation buffer to be in place by 2014.

Stress testing has also been a major tool for risk measurement. In January 2011, a technical working group on stress testing was established by the SES to conduct stress exercises on the balance sheet of banks. These tests are designed to evaluate the banks’ collective and individual capability for handling shocks to their respective banking operations. Market events considered in the stress tests include unusual changes in local and foreign interest rates; market illiquidity; or defaults caused by credit exposures to economic activities, large counterparties (i.e., conglomerates), and in the consumer portfolios of these banks.

Similar models could be developed for macroprudential purposes. Other new models are also being evaluated for the purposes of the FSCComm and the FSCC.

Complementing Microprudential with Macroprudential Policy: A Major Reform?

Financial stability is becoming a central supervisory concern across the financial industry. Taking a proactive stance, the BSP has endeavored to make this macroprudential framework available in the Philippine banking industry. Much effort, however, is still required to formalize the implementation of macroprudential policies. The concept of financial stability is multifaceted and is proving to be difficult to grasp. This then necessarily leads to the clear challenge of complementing microprudential regulations with macroprudential policies, which is a key concern that still needs to be emphasized and appreciated. Organizational matters also need to be ironed out. Microprudential tools may already be familiar, but molding them to financial stability purposes and creating additional measures are still challenges.

The beginning has not been easy. Despite the challenges ahead, however, the Philippines is on its way to creating the necessary and appropriate infrastructure to effect macroprudential regulation in the local banking industry.

Final Thoughts

No one will dispute that pursuing a financial stability mandate is essential, particularly within the current paradigm for financial markets that relies on cross-border, cross-currency, complex-instrument transactions. Risks can arise from different sources and successfully managing these risks is the value proposition of financial markets in general.

However, the financial stability task is not a marginal exercise, and institutionalizing the capacity to undertake macroprudential policy is rife with challenges. The BSP approaches financial stability with the clear understanding that it is not a unique state defined by absolute values of indicators. Instead, multiple possible combinations allow a system to thrive and address the evolving needs of its constituents. What may be consistent with stability in the past may be a recipe for instability in a different market situation.

It is also believed that financial stability is neither the micro-foundation of macro policy nor the macroeconomic translation of micro behavior. Instead,

financial stability should bind macro, monetary, financial, infrastructure, and fiscal policies together so that the systemic implications of transaction-level risks can be understood. To move forward, sharper tools, a harmonized view on managing and mitigating financial risks, and a commitment to cooperation and coordination are needed.

None of these prerequisites are trivial. But apart from the coordination challenges discussed above, the personnel of regulatory institutions need to develop new core competencies. BSP Governor Amando M. Tetangco Jr. points out

it would be very useful to develop staff who have the expertise of a macro-financial economist, the preciseness of a financial engineer, the orderliness of an accountant, the eloquence of a commentator, the imagination of a physicist and the perspective of a market practitioner.⁷

Such a multifaceted skill set is not innate to any financial regulator. However, it appears to be the minimum required if, indeed, an effective foray into financial stability is to be made.

Macroprudential Policy in Mongolia

BYADRAN LKHAGVASUREN

Macroprudential policy is new to many countries and became an overarching public policy item amid the global financial crisis. The main objective of the Bank of Mongolia is to ensure the stability of Mongolia's currency, the togrog (tog). Within this main objective, the Bank of Mongolia also promotes the balanced and sustained development of the national economy. The Bank of Mongolia's functions include supervision of banking activities, financial supervision of commercial banks, and the review of applications for the establishment of new commercial banking entities and branches of existing financial institutions.

Since the establishment of the two-tiered banking system in 1991 by the new banking law, Mongolia has faced two waves of banking failures, in the 1990s and in 2008–09. Currently, the Bank of Mongolia plays a crucial role in the banking sector as regulator, but the supervision and regulatory policies governing the nonbank financial sector are conducted by the Financial Regulatory Committee of Mongolia.

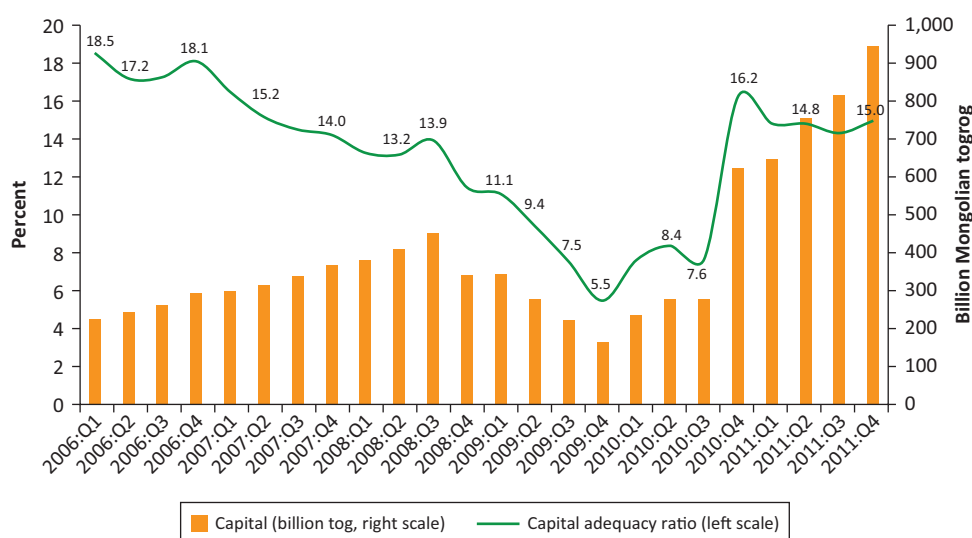
⁷ From the session remarks delivered by Amando Tetangco Jr at the Bank of Japan and Bank for International Settlements High-Level Seminar “Financial Regulatory Reform,” November 2010, Hong Kong Special Administrative Region.

Having been introduced only recently, the macroprudential mandate has yet to be defined and thus its compatibility with microprudential supervision can only be inferred. Within the Bank of Mongolia, the two perspectives are to be implemented by separate departments: Macroprudential policy would likely be determined and defined by the Monetary Policy department and microprudential supervision will be carried out by the Supervision department. Any potential conflicts or clashes in policy implementation could be resolved through regular and active dialogue between the two units and with other relevant authorities.

In accordance with its legal strengths and functions, the Bank of Mongolia has used several prudential tools as macroprudential policy instruments. The economy involves time-varying risks, and consistent coordination between fiscal and monetary policies is questionable. As a consequence, the liquidity coverage ratio was increased from 18 percent to 25 percent in November 2011; the capital adequacy ratio was raised from 12 percent to 14 percent in December 2011 and the countercyclical buffer for systemically important banks was added in accordance with the Basel Capital Accord; the minimum capital requirement was increased from tog 8 billion to tog 16 billion in 2011; the reserve requirement was increased from 9 percent to 11 percent in August 2011; and the policy interest rate was increased to 12.75 percent in March 2012. See Figure 1.1.

Mongolia's economy is highly dependent on a few commodities and thus is vulnerable to procyclicality (overheating). The Bank of Mongolia, the ministry of finance, and other regulatory authorities should implement countercyclical policies to sustain macroeconomic and financial stability and avoid a repeat of the boom-and-bust cycle, thereby dampening systemic risk and limiting spillovers from stress.

Figure 1.1. Mongolia: Capital Adequacy of the Banking Industry



Source: Bank of Mongolia supervisory database.

As a step to keep pace with recent changes in international financial standards, in particular Basel III, and to contain the threat of high levels of inflation, excessive lending, and the like—which were a recurring theme for the recent period in Mongolia—sets of policy initiatives that aim to strengthen the resilience of both the financial system as a whole and the individual sectors or institutions have been proposed and are under robust discussion among policymakers. Among the policies proposed are to raise the policy rate to curb high-speed inflation and lending, and to require banks to increase their current minimum paid-in capital requirement to twice its size by the middle of 2013 to improve the creditworthiness of banks.

The Bank of Mongolia is surveying new policy instruments to adopt in the near future, including dynamic provisioning, provisioning on normal loans, caps on foreign currency lending, credit limits by economic sector, and time-varying capital requirements.

There are several practical methods for dynamic provisioning; the Spanish model is the most well-known. In 1999, Spain had the lowest ratio of loan loss provisions to gross loans in a decade. Competition among banks was on the increase, with banks lowering interest rates and spreads, which resulted in inadequate loan pricing. The Spanish banks' loans were concentrated in the construction sector during the asset bubble period, up to 2009, which led to a significant increase in bad loans. The Bank of Spain first introduced dynamic or statistical provisioning in 2000 to limit credit growth and to create a buffer for the bad times (Saurina, 2009).

Dynamic provisioning in Spain was based on a comparison between a bank's current specific provisioning and the average latent loss in its loan portfolio. Dynamic provisioning initially included three types of provisioning: specific, generic, and statistical. Latent risk differs depending on the type of loan, and fixed parameters were used and a cap was placed on the size of the provision fund to avoid excessive expense pressure on banks. Spanish banks criticized dynamic provisioning, arguing that it put them at a disadvantage in the international market. These issues, coupled with the theoretical and practical arguments about accounting for statistical provisioning, led regulators to reform statistical provisioning. In 2004, statistical provisioning was subsumed under generic provisioning and a new cap was introduced. The formula for the general provisions is shown in equation 1.2:

$$gen_t = \alpha \Delta C_t + \left(\beta - \frac{spe_t}{C_t} \right) C_t, \quad (1.2)$$

in which gen_t is general provisions required to be set aside at period t , spe_t is specific provisions at period t , α is the coefficient representing the latent loss, β is the average specific provisioning for full lending during the business cycle, C_t

is the stock of loans at period t , and ΔC_t is credit variation (positive in a lending expansion, negative in a credit crunch). The estimation of general provisioning differs across six risk buckets of loans based on the economic outlook and different risk profiles. Thus, equation (1.2) can be transformed into the following:

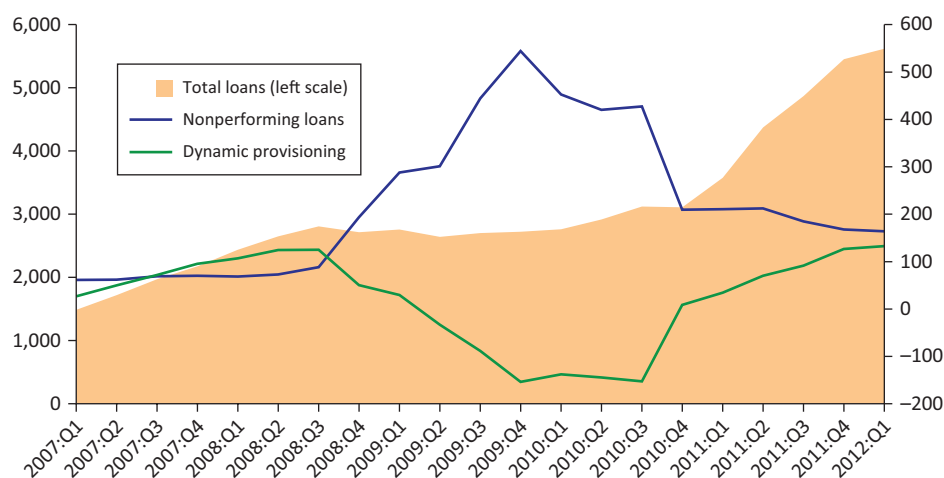
$$gen_t = \sum_{i=1}^6 \alpha_i \Delta C_{it} + \sum_{i=1}^6 \left(\beta_i - \frac{spe_{it}}{C_{it}} \right) C_{it}. \quad (1.3)$$

However, data limitations make it impossible to estimate the parameters of the Spanish model for Mongolia. The Spanish system is based on detailed information about credit losses from the credit register managed by the Bank of Spain. Without equivalent information for Mongolia, the more accurate system of dynamic provisioning cannot be put in place. For example, the dynamic provisioning models are estimated by the Bank of Spain based on analysis of 40 years of historical data. In contrast, the credit registry operated and managed by the Bank of Mongolia has collected data only since 2010 and the database lacks accurate data on loan losses.

A criticism of the Spanish model is that the estimation is historical rather than forward looking and there is no guarantee that history will repeat. In addition, unlike in Spain, Mongolia's banks have come to no consensus about the risk buckets or types of loans.

The current proposal is that a 1 percent provision be set aside for all new lending. This loan provisioning will be included in Tier 2 capital as a potential buffer against loan losses. According to an initial assessment conducted by the Bank of Mongolia, this approach can build up a provision fund of tog 13.6

Figure 1.2. Mongolia: Proposed Dynamic Provisions and Loan Quality (millions of togrog)



Source: Bank of Mongolia supervisory database.

billion. Large banks will need to hold reserves of tog 9.3 billion, equivalent to 0.3 percent of all new lending on average. See Figure 1.2.

This proposed approach to dynamic provisioning has a somewhat significant effect on banking capital adequacy. It may lead to a decrease in the Tier 1 capital ratio of 0.2–0.4 percent. In other words, the approach will affect banks with higher Tier 2 capital. However, this proposed approach has less effect on the profitability of banks. Dynamic provisioning is expected to help reduce risky lending and to help banks accumulate capital buffers during noncrisis times.

There are several advantages and disadvantages to introducing dynamic provisioning to Mongolian financial markets.

Among the advantages are

- the ability to accumulate provisions so as to reduce provisioning and reserves during bust times,
- reduced vulnerability of banks during crises,
- limits placed on credit growth through the Tier 1 capital ratio, and
- an increase in Tier 1 capital.

The disadvantages of dynamic provisioning include the following:

- does not comply with international accounting standards,
- results in inconsistency between audit reports and accounting principles,
- reduces profitability of the banking industry,
- puts pressure on commercial banks, and
- constrains banking development.

To introduce this approach, the Mongolian regulators and policymakers need to reconsider laws, codes, and regulations related to accounting and reporting.

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Optimal Integration of Macroprudential and Other Policies

Incorporating Macroprudential Instruments into Monetary Policy in Peru

RENZO ROSSINI

Ninety years ago, in the aftermath of World War I, the Reserve Bank of Peru was created with the purpose of providing “an elastic currency,” meaning that the new institution should avoid sharp fluctuations in credit and activity through timely liquidity injections. This event is representative of the many central banks that originated with the aim of ensuring the stability of the financial system as a whole, an aim that after the 2008–09 global economic and financial crisis is gaining a more prominent role.

This section deals with Peru’s experience with introducing macroprudential issues into the design and implementation of the country’s monetary policy.

General Characteristics of the Macroprudential Framework

The aim of macroprudential policy is to limit systemic financial risks to prevent negative impacts on the real sector and on the financial sector as a whole. Central banks and bank supervisors have a number of different instruments at their disposal to prevent a systemic financial crisis, among them reserve requirements, countercyclical provisions, and limits on loan-to-value ratios. These instruments are oriented first toward preventing financial excesses and second to acting when a systemic crisis arises; they are not designed to replace policies needed to maintain macroeconomic stability or the financial health of individual financial institutions.

The main difficulties with macroprudential policies are related to the lack of a formal institutional framework that has both the mandate to set the policy goal and the proper instruments. Also, there is a great difficulty in

implementing models that relate those policy instruments to final objectives. This is uncharted territory, and defining new routes through it will depend on the initial conditions and on the specific situations of different economies. Thus, as the IMF (2011) states, “one-size does not fit all.”

In Peru, the policy tools of the Superintendence of Banks and the central bank, unlike their main operational instruments, have been oriented toward the prevention of a systemic crisis, thus extending the scope of their specific mandates.

Dollarization: The Main Financial Vulnerability in Peru

The concern with macroprudential issues reflects a specific vulnerability in the financial system caused by the importance of the financial dollarization of banking deposits and credits. Dollarization was the consequence of the reaction of private agents looking to protect their wealth in an environment of high inflation in Peru between 1976 and 1986 and hyperinflation between 1987 and 1990, a period in which dollar assets were the only way to hedge against rampant inflation. Since 2002, dollarization has been reversed from its level of 80 percent to 45 percent in 2012, as the result of the attainment of price stability and progress in the development of a securities market in local currency.

Financial dollarization introduced two important macroprudential risks. First, sharp currency depreciation exposes firms to important capital losses, eroding their ability to service their bank credits, which could ultimately produce a credit crunch. This process is known as the balance sheet effect of currency depreciation.

A second negative risk of financial dollarization is associated with a run on bank deposits or a sudden stop of the external funding of banks, which, without an effective lender of last resort to provide foreign currency, would become a systemic risk. In this environment, firms have access only to short-term financing in domestic currency, bringing with it the risk of movements of the interest rate; and to long-term financing in foreign currency, with the accompanying exchange rate risk.

Monetary Policy Framework in Peru: Hybrid Inflation Targeting

Monetary policy in Peru incorporated macroprudential considerations following the contagion of the Russian default in 1998, which resulted in a financial crisis in Peru produced by a combination of a sudden stop of capital flows and sharp currency depreciation. The rapid increase in nonperforming loans ended in a severe credit crunch, with substantial systemic and real

effects. The number of firms filing for bankruptcy jumped 400 percent, the number of banks was halved, and economic activity and credit only started to recover four years later.

The monetary policy framework designed after this crisis included conventional inflation targeting, but with the important addition of macrofinancial considerations to ring fence the risks associated with financial dollarization. To limit foreign exchange liquidity risks and to avoid credit booms and crunches, reserve requirements are actively managed and international reserves are accumulated to finance an effective lender of last resort in foreign currency. Also, to limit exchange credit risk, the exchange rate regime is an administered floating system, the objective of which is to reduce the volatility of the exchange rate.

An inflation targeting regime was introduced in 2002, with an inflation target of 2 percent. The short-term interest rate was used as its main policy instrument. This regime reduced the extreme volatility in the money market interest rate associated with the previous use of monetary targets and with the attempts to reduce the volatility of the exchange rate using changes in the liquidity position in the money market. In the inflation targeting regime, the policy interest rate is modified as needed to reach the inflation target, and is used as a countercyclical instrument.

The reduction of volatility in the interbank market has another important implication from a macroprudential perspective. Reducing volatility reduces the possibility of failure in this market, which is a source of liquidity funding, during stress episodes.

Macroprudential Considerations in the Design of Monetary Policy

In an environment of financial dollarization, the conventional channels through which monetary policy decisions affect economic activity and inflation may not be sufficient to attain policy objectives. The conventional policy instrument has to be complemented with unconventional instruments. For example, banking credit in dollars is not within the conventional policy framework. Also, a sharp movement of the exchange rate could alter all the monetary policy transmission mechanisms. For those reasons, the use of reserve requirements, sterilized foreign exchange interventions, and the accumulation of international reserves became part of the policy arsenal of the central bank.

To assess the need to apply the unconventional policies, the Central Reserve Bank of Peru relies on a set of statistics that have proved to be good early indicators of macrofinancial problems. For example, a credit-to-GDP ratio in excess of the range around its tendency is a signal of a possible credit

boom or crunch. In that moment, there is room to adjust the unconventional quantitative instruments.

Another important indicator is related to the housing market. An analysis of trends and of ratios of prices to annual rent can detect the possibility of a housing bubble. Also, a deviation of the real exchange rate from its equilibrium level creates an incentive to divert resources to nontraded activities. Financing this process with short-term foreign liabilities causes a potential bubble that can explode with systemic consequences. Thus, real exchange rate misalignments can be another important leading indicator of systemic financial problems. The solution to this misalignment requires far more than just monetary actions.

The identified risks and the proposals to control them are analyzed in the semiannual financial stability reports that the central bank has published since 2006.

Reserve Requirements as a Macroprudential Instrument in a Dollarized Economy

The main unconventional monetary policy instrument in Peru is the reserve requirement ratio, which is applied according to the denomination of banks' liabilities. The ratio is differentiated between bank liabilities in national currency and those denominated in foreign currency. For bank liabilities in foreign currency, the ratio is further differentiated by the source of the liability, deposits in foreign currency, and foreign credit lines. For example, at the time this section was written the reserve requirement ratio for domestic currency deposits was 25 percent, for foreign currency deposits 55 percent, and for short-term external credit lines 60 percent. There are two special cases in this reserve requirement policy. The first refers to bank liabilities in domestic currency to nonresident investors, for which the required ratio exceeds 100 percent to limit the carry. The second special case is the exemption of foreign credit lines with maturities longer than two years.

In normal times, changes in reserve requirement ratios occur much less frequently than changes in the policy interest rate. However, during periods of financial stress, changes in reserve requirements have been used actively, particularly when there have been significant capital inflows or outflows like those before and after the Lehman Brothers bankruptcy in September 2008.

The contrast in the evolution of the credit-to-GDP ratio in Peru during the Lehman bankruptcy event as compared with the Russian crisis of the late 1990s shows the effectiveness of a policy framework that combines conventional mechanisms with more quantitative tools like reserve

requirement ratios. The differentiated structure of reserve requirements has also reduced the importance of short-term liabilities in banks' balance sheets.

International Reserves Accumulation as a Preventive Macprudential Tool

The sizable international reserves at the central bank have served as a credible source of liquidity injections during sudden stops of capital inflows. Just as important has been the ability and willingness of the central bank to use the reserves during negative financial events.

Any discussion of the appropriate level of international reserves must consider the different risks confronted by the economy and its level of risk tolerance, and must quantify the possible reductions in the level of reserves during different shock events. It is difficult to mechanically define an optimal level of reserves, considering the different circumstances and vulnerabilities faced by each country. For example, in Peru the actual size of international reserves covers six times the amount of short-term bank liabilities, but still does not cover 100 percent of all bank liabilities with the domestic private sector.

Crisis Management and Liquidity Provision by the Central Bank

The reaction of the Central Reserve Bank of Peru after the shock of the Lehman Brothers crisis illustrates the importance of preventive measures oriented toward accumulating international liquidity and avoiding the ignition of mechanisms that could have ended in a credit crunch (Rossini and Quispe, 2010).

The total injection of liquidity to banks during the last quarter of 2008 was equivalent to 9 percent of annual GDP; the measures included foreign exchange sales to provide liquidity in foreign currency for an equivalent of 6 percent of GDP. The banks' need for systemic liquidity was covered and complemented with one-year repos and the liberation of funds through reductions of reserve requirements.

Despite the significance of this external shock, banking credit to the private sector continued to grow in Peru in 2008 and in 2009 instead of falling as it did in other countries in Latin America, showing the importance of both the previous preventive accumulation of international liquidity and the proactive and sizable injections of liquidity during the crisis.

The 1998 financial crisis, which had a negative impact on activity, on the financial system as a whole, and on the effectiveness of monetary policy,

created a special policy sensibility geared toward avoiding any other credit contraction event. This sensitivity has aided the resilience of the Peruvian economy to the recent global crisis.

Sterilized Intervention to Reduce Volatility and Not to Fix the Level or Trend of the Exchange Rate

Apart from the use of reserve requirement ratios and international reserves accumulation, the central bank in Peru includes sterilized foreign exchange interventions in its policy toolbox to avoid sharp fluctuations in the exchange rate that could ignite a balance sheet effect in the corporate sector. Foreign exchange intervention is not performed according to any rule, and avoids ensuring any target level or any target range. It is far from being some form of fixed exchange rate.

A comparison of the evolution of the nominal exchange rate index in Peru with an average index of exchange rates in Latin American countries that follow inflation targeting regimes illustrates that Peru has been able to eliminate extreme levels without affecting the tendency. The avoidance of extreme variations in the exchange rate has been important to preventing financial disruptions in dollarized firms, and also to discouraging the adoption of open cross-currency speculative positions that could have endangered the stability of the financial system when those positions were sizable and highly leveraged.

An important issue with sterilized foreign exchange interventions is the disruption that can emerge as the size and cost of the central bank's liabilities grow. In Peru, the succession of fiscal surpluses during periods of favorable tax earnings allowed accumulation of public sector deposits at the central bank as the main source of sterilization equivalent to 10 percent of GDP, reducing the relative importance of placements of central bank securities.

Building a Solid Financial Infrastructure: The Treasury Bond Market

As mentioned, efforts to reduce systemic risks include preventive macroprudential measures and actions to forestall a financial crisis. The development of financial infrastructure is also important to building a more resilient financial system, able to offer more options to diversify risks.

An important development to enhancing long-term financing in domestic currency was the launch in 2001 of long-term treasury bonds in domestic currency, including maturities longer than 30 years. This allowed a benchmarking government debt yield curve to be established as reference for private securities in domestic currency, similar to mortgage loans and corporate bond issuances.

Governance Aspects of the Macroprudential Framework in Peru

The institutional macroprudential framework in Peru is not based on a formal mandate, but occurs in coordination meetings to review risks and actions to control them. The central bank produces and publishes a financial stability report to provide information about risks and possible policy actions. This framework takes into account the independence of the different participants, but raises the possibility of a coordination failure.

The introduction of macroprudential aspects to the design and implementation of the central bank's monetary policy is accompanied by macroprudential considerations in the microprudential actions of the Superintendence of Banks. For example, in 2008 the superintendence introduced a countercyclical credit provisioning system on the basis of cumulative GDP growth, with the aim of avoiding excesses in banking credit.

In light of the credit risk of currency depreciations, the superintendence has included additional provisioning requirements for banks that extend foreign exchange credits to borrowers without a cash flow in that currency. Also, to reduce exchange risks, limits to open foreign exchange positions of banks are in place. The introduction of an additional capital requirement to prevent excessive loan to value in mortgage loans is also under consideration.

Conclusion: A Work in Progress

The Central Reserve Bank of Peru has a prominent role in the design and implementation of macroprudential policies given its position in the payment system, its access to relevant information to identify systemic financial risks, and its interest in defending the transmission mechanisms for monetary policy.

Conventional monetary policy instruments can be insufficient for preserving macroeconomic stability when financial channels are strong enough to create excesses like credit booms or asset inflation (Borio, 2011a). In these circumstances, the possibility of a systemic crisis would negatively feed back on economic activity and on the stability of the financial system as a whole. Because of the existence of a partially dollarized financial system in Peru, the central bank uses quantitative instruments to respond to early indicators of substantial and autonomous movements of liquidity and credit that may generate systemic risks. The use of reserve requirements, sterilized foreign exchange interventions, and changes in the maturity of its net assets proved to be effective at preventing either a credit boom or a credit crunch during the Lehman event.

However, central banks normally have a limited set of policies at their disposal for maintaining macrofinancial stability. Given that other independent entities have instruments, mainly for microprudential use, there is room to work on formal institutionalization of the macroprudential framework in Peru.

Incorporating Macroprudential Instruments into Monetary Policy: Thailand's Experience

CHAYAWADEE CHAI-ANANT

Macroprudential Policy Formulation at the Bank of Thailand

The role of central banks in preserving price stability and fostering financial stability has evolved over time, and this is true for the Bank of Thailand as well. In the past decade, the bank has gone through many changes, both in legislation and governance and in its monetary policy and supervision framework. With regard to macroprudential measures, the painful lessons from the Asian crisis in 1997 showed that financial imbalances, which can emerge in a period of robust economic expansion, may reveal the vulnerability in the economic system and impede sustainable growth.

Mindful of this, the Bank of Thailand's Monetary Policy Committee has made "the monitoring of factors contributing to financial imbalances" a part of policy formulation since July 2004. Signs of financial imbalances in seven key areas are monitored. An entire chapter on financial stability conditions and outlook was added to the bank's inflation report beginning in July 2005. The goal of this surveillance is to ensure constant vigilance against threats to financial stability, even in the absence of clear signs of inflationary pressure or asset-price bubbles.

The inclusion of a financial stability analysis in the inflation report reflects the bank's conviction that such considerations are important for monetary policy. The Bank of Thailand has long recognized the contribution that monetary policy can make to limiting the buildup of financial imbalances and that price stability alone may not be sufficient to ensure financial stability. In the bank's experience the issue has never been whether monetary policy should take into account financial stability concerns, but how best to achieve this end. Efforts to develop the analytical framework and to improve data quality to ensure comprehensive assessment of such risks are ongoing.

Illustration of Thailand's Macroprudential Policy

The Bank of Thailand has made use of macroprudential tools for some time to complement monetary policy in managing potential buildups in financial

imbalances. The use of these tools, along with a flexible inflation targeting framework, contributed to the resiliency of the Thai financial system. The macroprudential policies implemented include the following:

- tightened regulation of credit card loans and personal loans in 2002, 2004, and 2005;
- net foreign exchange position implemented in 2002;
- loan-to-value ratio on mortgage loans implemented in 2003, and reduced in 2009, and 2010;
- loan-loss provisioning implemented in 2006 and 2007; and
- withholding tax imposed in 2010.

Tightened Regulation of Credit Card Loans and Personal Loans

The first example is the use of macroprudential policy to address sectoral imbalances in alignment with monetary policy and microprudential regulation. Against the backdrop of the 1997 Asian financial crisis, weak corporate loan demand (partly caused by the many corporations that were still in the debt-restructuring process) amidst ample liquidity in the banking system put considerable pressure on banks to tap the consumer finance business more aggressively. This led to excessive growth of credit card lending, rising from a growth rate of –3.1 percent in 2000 to 76.7 percent in 2002. During this period the same situation could also be observed in other Asian countries, such as the Republic of Korea, where LG Credit Card company started to show signs of problems.

Against this backdrop, the Bank of Thailand decided to tighten regulation on credit card and personal loans. This decision was implemented incrementally, starting by including nonbank credit card companies in the scope of supervision, followed by minimum requirements for credit card holders, such as maximum credit line and minimum repayment. Similar rules were applied to personal loans in 2005. As a result of these measures, the growth of credit in these markets declined remarkably. This experience shows that macroprudential policy, when implemented properly, can tackle sectoral imbalances directly, and can be used as an alternative to conventional monetary tightening that might have broadly based, but unintentional and undesirable, effects on other economic sectors.

During the early years of the first decade of the 2000s, the Thai economy was still in a fragile stage, not yet fully recovered from the 1997 financial crisis. Therefore, the policymakers of the time decided to adopt more-targeted macroprudential measures to tackle the problem, rather than hiking the policy

interest rate, which would have had an adverse impact on the whole economy. The interest rate can be a blunt instrument, particularly when an economy is recovering. While imbalances were growing in credit cards and consumer loans, had the Bank of Thailand raised the policy rate too fast the recovery process might have been stalled.

Net Foreign Exchange Position Implemented

Because of the rising and comparatively high foreign exchange exposures of some financial institutions, the net foreign exchange position, for both individual currencies and on an aggregated basis, has been regulated since 2002. This regulation aims to help contain foreign exchange risk in the Thai banking system. Under this rule, financial institutions are required to maintain a net foreign exchange position of an individual currency not exceeding 15 percent of total capital, and the institution's aggregate position must not exceed 20 percent of total capital. These measures have been successful; both individual and aggregate currency limits have remained well below the regulatory requirement. In particular, net foreign exchange positions declined significantly during the crisis in 2008. This outcome also reflected the ability of financial institutions to manage foreign exchange risk and adjust their exposures to be appropriate for the changing global environment.

Loan-to-Value Ratio on Mortgage Loans

The use and adjustment of the loan-to-value ratio by the Bank of Thailand demonstrated its preventive nature and, more important, the flexibility to fine tune the policy in response to changing economic circumstance. In 2003, the 70 percent limit for mortgages with a value of at least 10 million Thai baht was first introduced to preempt speculation in the luxury real estate segment. Then, amid the global downturn in 2009, the 70 percent loan-to-value limit was replaced with a more risk-sensitive rule that imposes a higher risk-weighted capital charge for mortgages with loan-to-value ratios greater than 80 percent.

Recognizing its effectiveness, in late 2010 the Bank of Thailand extended the loan-to-value rule to mortgages of less than 10 million baht. Two policy considerations went into the design of the rule. First, the rule prevents excessive risk taking by banks during periods of intense competition in the mortgage market (although there was no obvious sign of a property price bubble in this instance). Second, the rule was purposely made more stringent for high-rise mortgages than low-rise mortgages, going into effect one year earlier, because of the more intense competition in the high-rise segment. The loan-to-value rule for high-rise mortgages went into force at the beginning

of 2011; however, the implementation date for low-rise mortgages was postponed a year from the original date of January 1, 2012, in light of the severe flood situation in Thailand. In addition to the loan-to-value measure, the Bank of Thailand also requires banks to report the details of real estate loans valued at more than 100 million baht to make sure that the loans are prudent and not speculative.

Loan-Loss Provisioning in 2006 and 2007

The loan-loss provisioning measure is a macroprudential policy adopted in the context of “leaning against the wind” (or countercyclicality). During the extended periods of profitability in the banking industry in the middle of the first decade of the 2000s, the Bank of Thailand gradually tightened loan loss provisioning rules in accordance with International Accounting Standard 39. The objective of this measure is to have banks build buffers during good times against impaired assets. As a result, Thai commercial banks remain strong and resilient, as reflected by strong profits and rising nonperforming loan coverage ratios.

Imposition of Tax on Foreign Investment in Bonds

The last macroprudential policy is the imposition of withholding tax in 2010. In October 2010, due largely to speculative inflows, the Thai baht appreciated rapidly (approximately 11 percent from the beginning of the year), threatening exports. In response, the government reintroduced a 15 percent withholding tax on interest and capital gains earned by foreign investors on domestic bonds in an effort to curb the currency appreciation. The number of nonresident bond holdings increased notably from less than 2.5 percent in early 2010, to approximately 5.0 percent in October 2010. This measure aims to slow down so-called hot money flows into the bond market.

Practical Challenges: Coordination and the Appropriate Policy Mix

For the future, it is apparent that a combination of monetary policy and prudential policies, micro and macro, is necessary to effectively safeguard financial stability and macroeconomic stability at large. The policy is likely to be better coordinated if regulatory power remains with the central bank. Experience in Thailand has shown that important synergies are to be gained from having the supervision responsibilities within the central bank. Chief among these are the cross-sharing of information and expertise as well as the ability to internalize possible trade-offs between monetary and financial stability concerns in forming the respective policies. This is by no means a fool-proof arrangement, and there is definitely a trade-off, but cost-benefit considerations point to a single authority with a broad mandate.

Although monetary and regulatory authorities are under the same roof in Thailand, attaining effective policy coordination and information sharing have proved challenging at times. Achieving the synergies mentioned above is easier said than done. A key area that is still evolving is the appropriate governance structure. To further support the work between the Monetary Policy Committee and the Financial Institutions Policy Committee, an internal subcommittee on financial stability was recently established to more formally coordinate financial stability analysis from a macroeconomic perspective at the staff level. This subcommittee brings together not only the surveillance capabilities from both the monetary and financial-institution sides of the bank, but also takes input from outside regulatory bodies that oversee institutions that are outside the Bank of Thailand's mandate but may nevertheless contribute to financial stability. The work of this subcommittee will serve as a key input for the policymaking bodies of the Bank of Thailand.

Choosing the appropriate policy tools at the right time requires careful balancing. Ultimately, the policy interest rate still remains the primary tool for influencing aggregate activity and inflation, and prudential tools are employed to deal with more specific problems in the financial sphere. Weighing the benefits and limitations of each tool is a delicate but necessary challenge. It is important not to exaggerate what macroprudential policy can achieve. Macroprudential measures can be employed to complement monetary policy but are not a substitute for it. In the end, it is the interest rate that sets the price of leverage.

Shared Responsibility, Importance of Price Stability and Independence

Finally, three relevant points must be stressed:

- First, the preservation of the financial system is ultimately a shared responsibility. With regard to price stability, the central bank has at its disposal monetary policy instruments to attain price stability. Nevertheless, the central bank by itself does not have sufficient instruments and powers to ensure the stability of the financial system. The stability of the financial system also depends on the action of other regulators as well as on the attitudes and practices of market participants.
- Second, notwithstanding the financial stability mandate, the conduct of monetary policy with the aim of achieving price stability over the medium and long terms should remain the main responsibility of any central bank. The performance of financial stability tasks should be consistent with and supportive of the preservation of price stability.
- Third, having a larger mandate unavoidably puts central banks in a more complex position because larger segments of the public will have

more interest in the banks' actions. It is likely that the broader the range of responsibilities for financial stability assigned to the central bank, the greater the degree of interaction between the government and the public in general. Central bank independence, therefore, becomes more important to ensuring the ability of central banks to implement unpopular (mostly countercyclical) policies in a timely, independent, and transparent manner.

Macprudential Policies and Their Effectiveness: Hong Kong SAR

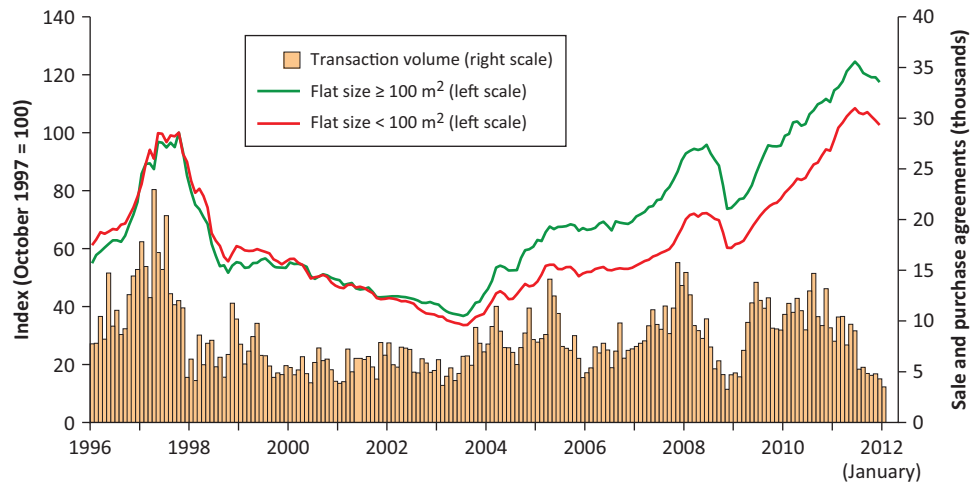
CHO-HOI HUI

As the various monetary and fiscal programs introduced by the United States and Europe took effect following the collapse of Lehman Brothers in 2008, there were strong flows into the Hong Kong dollar in 2009. The Hong Kong dollar monetary base almost tripled its precrisis level, with significant increases in the aggregate balance of the banking sector and the issuance of additional exchange fund bills to unprecedented levels. One direct impact of these inflows on the banking sector was that the cost of funds for Hong Kong banks dropped to an exceptionally low level, and has since stayed below 0.5 percent. Banks' lending rates also declined, with their mortgage interest rates remaining low at the 1.0–2.5 percent level.

In the same period, significant upward inflationary pressures occurred, leading to negative real interest rates in Hong Kong SAR. Boosted by low borrowing costs and high inflation expectations, residential property prices in Hong Kong SAR have increased drastically since 2009, after a significant decline during the global economic and financial crisis in 2008–09. The surge in prices has been particularly strong for luxury apartments. One conventional way to assess property price levels is to compare them with their peak levels before the Asian financial crisis of the late 1990s. As shown in Figure 2.1, the current average prices for both the luxury market (flat size at or greater than 100 square meters) and the mass market (flat size less than 100 square meters) are already higher than their historical peaks.

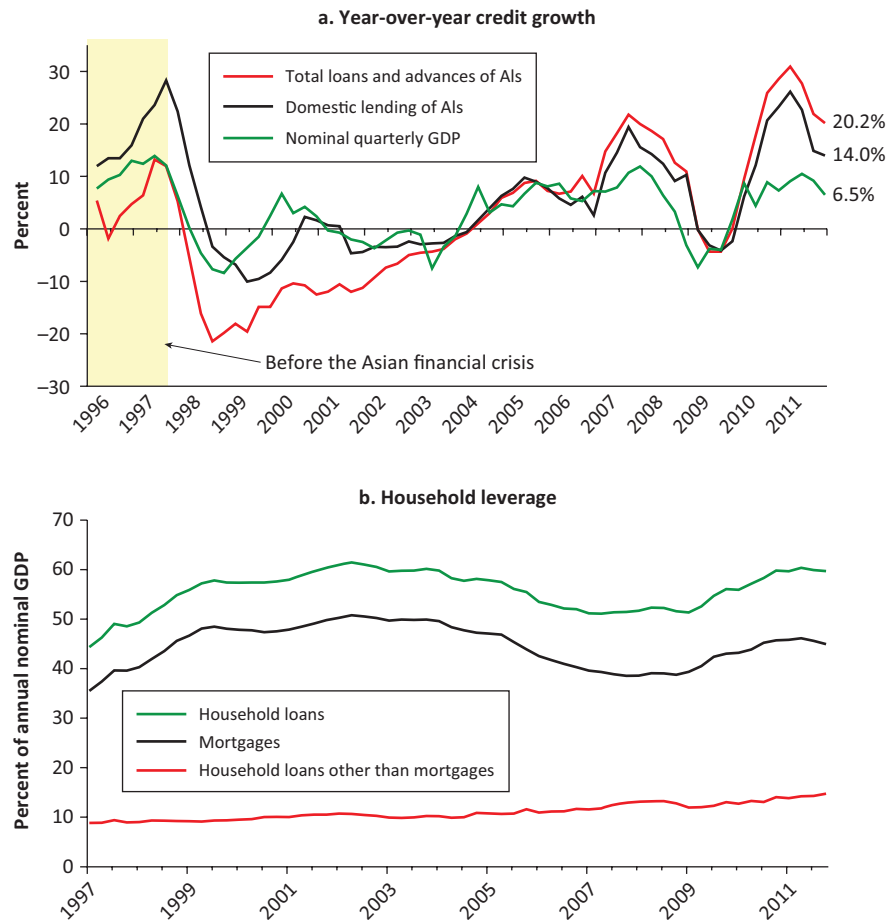
Because banks are major providers of funds to property investors, credit growth has been very strong in the Hong Kong banking sector. The year-on-year growth of domestic lending was about 26 percent in March 2011 as shown in Figure 2.2. This credit boom is due to the strong demand for residential mortgages as well as increased lending to Mainland China. With a significant and persistent increase in mortgage lending, the household debt burden, defined as total household loans to annual nominal GDP, also shows an increasing trend, indicating higher financial risk in the household sector.

Figure 2.1. Hong Kong SAR: Residential Property Prices and Transaction Volume



Source: Hong Kong Monetary Authority.

Figure 2.2. Hong Kong SAR: Credit Growth and Household Leverage



Source: Hong Kong Monetary Authority.

Note: AI = authorized institutions.

The developments have raised concerns about the risk of credit-asset price spirals. Because property-related lending usually accounts for 40–50 percent of total domestic loans, such credit-asset price spirals would have systemic impacts on the banking system. In Hong Kong SAR's experience, the rapid growth in domestic lending in 1996–97 was followed by a sharp fall of property prices (Figure 2.1) and a significant rise in the nonperforming loan ratio from a low of 2.1 percent to a peak of 10.6 percent at the end of September 1999. The credit loss after rapid credit growth could create a huge burden on banks' balance sheets for years after the boom.

Loan-to-Value Limits

Given the past evidence and risk of possible credit-asset price spirals, loan-to-value caps become an important macroprudential measure for mitigating the risk in the banking sector. A loan-to-value ratio of 70 percent on all properties was first introduced in 1992. Against a sharp increase in property prices in 1996, the Hong Kong Monetary Authority (HKMA) implemented the first tightening of the loan-to-value cap in January 1997 from 70 percent to 60 percent for luxury properties with a value of more than HK\$12 million; the cap remained at 70 percent for properties with lower values.

In the wake of the Asian financial crisis, Hong Kong SAR's property prices fell by more than 40 percent in one year from September 1997. Notwithstanding the sharp drop in property prices, the subsequent mortgage delinquency ratio never exceeded 1.5 percent, a low level by international standards. Judging from this, the loan-to-value policy is effectively reducing the credit risk that banks face and ensuring the quality of banks' mortgage loan portfolios. In 2002, the HKMA suspended the tighter loan-to-value cap for luxury properties, reverting to the 70 percent rate for all properties.

There have been four rounds of tightening of the loan-to-value policy in Hong Kong SAR since October 2009 amid strong capital inflows and sharp rises in property prices.¹ In view of the risk of an overheated property market and declining housing affordability, in June 2011 the HKMA undertook another round of tightening for residential properties valued at HK\$7 million and above. In addition, for cases in which the mortgage payment is not supported by incomes from Hong Kong SAR sources, the loan-to-value caps were lowered by at least another 10 percentage points. Reflecting the impact of the multiple rounds of macroprudential measures so far, the average loan-to-value ratio of new mortgages fell by 4 percentage points from 2010, to 56 percent in the first half of 2011.

¹ For details, see relevant press releases and circulars, which are available on the HKMA website.

Wong and others (2011) conducted a cross-country econometric assessment of the effectiveness of the loan-to-value policy. Among the 13 selected economies in the study, those adopting a loan-to-value policy are found to have a lower sensitivity of mortgage delinquency ratio to property prices, indicating that the loan-to-value policy improves the banking sector's resilience to property market shocks. The study also discusses whether loan-to-value policy should be adopted as an instrument to stabilize property markets. Only weak evidence suggests that the tightening of loan-to-value caps would be followed by lower property market activities. This conclusion holds for three common indicators of property market activities, including the rise in property prices, the property price gap (from the trend), and property transactions.

The finding seems to suggest that the loan-to-value policy may not be an effective instrument for targeting property prices. In contrast, the study finds strong evidence that a tightening of loan-to-value caps can reduce household debt leverage, which supports the proposition that the loan-to-value policy is a suitable instrument for containing risk in the banking sector. The policy effect is mainly transmitted through reducing household debt leverage, rather than constraining the property market, to contain the risk in the banking sector. The results are consistent with those in Wong and others (2004), which finds that prudent lending practices in Hong Kong SAR, guided by loan-to-value limits, were credited only for pausing the house price boom briefly in 1994. However, their contribution to guarding the system against the fallout from the crash in 1997 was clearly identified.

Other Macprudential Measures

In addition to the loan-to-value policy, the HKMA introduced a stress-testing element to the debt-servicing ratio limit for residential mortgages. Under this requirement, banks need to calculate unstressed and stressed debt-servicing ratios for borrowers.² For the unstressed ratio, which assumes the current level of interest rates, borrowers' debt-servicing ratios are subject to a cap of 50 percent. For the stressed ratio, which assumes a rise in mortgage rates of at least 2 percentage points, borrowers' debt-servicing ratios are limited to 60 percent.³ This macroprudential measure can alert borrowers and banks that a sudden rise in interest rates could reduce borrowers' repayment ability and increase default risk significantly.

On a broader scale of containing risk in the banking system, the HKMA also requires banks to hold regulatory reserves against latent credit risk. The main

² Debt-servicing ratios have been used for supervisory purposes in Hong Kong SAR since the 1990s.

³ For details, see HKMA (2011) and the HKMA circular "Prudential measures for residential mortgage loans," issued on August 13, 2010, available on the HKMA website.

objective of regulatory reserves is to address the insufficiency of accounting standards for banks' provisioning, stemming from a loss-incurred model and backward looking characteristics.

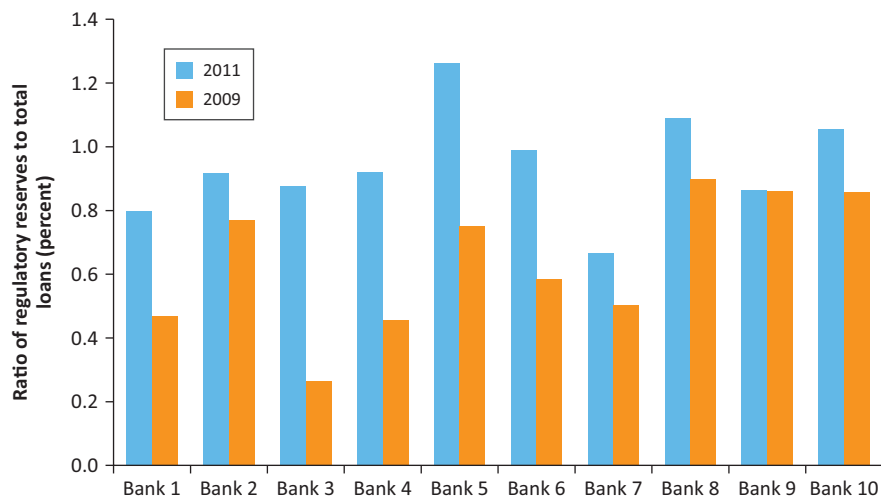
Under current accounting standards, provisions are set aside only when there is material and objective evidence of loan impairment. The HKMA introduced regulatory reserves in 2005. Banks are required to hold regulatory reserves in excess of individual and collective impairment allowances. The regulatory reserves usually range between 0.5 percent and 1 percent of total loans. Although the setting of the level of regulatory reserves is largely a matter of judgment, banks' historical loss experiences are a very important reference. Figure 2.3 shows the latest data for the ratios of regulatory reserves to total loans for selected Hong Kong SAR banks. Because strong and persistent credit growth raises concerns about latent credit risk, many banks are required to hold higher regulatory reserves despite their current sound asset quality.

The rising property prices also caused the Hong Kong SAR government to increase the stamp duty in November 2010. The stamp duty is a tax on property transactions. The special stamp duty ranges from 5 percent to 15 percent depending on the holding period of properties.

Effectiveness of the Macroprudential Measures

Although the various macroprudential measures were introduced a relatively short time ago, some of their effects can be observed. First, for the banking sector, the growth of mortgage lending leveled off in 2011 (see Figure 2.4). Households also reduced their debt-servicing burden moderately. Thus, the risk in the banking and household sectors seems to have been further contained.

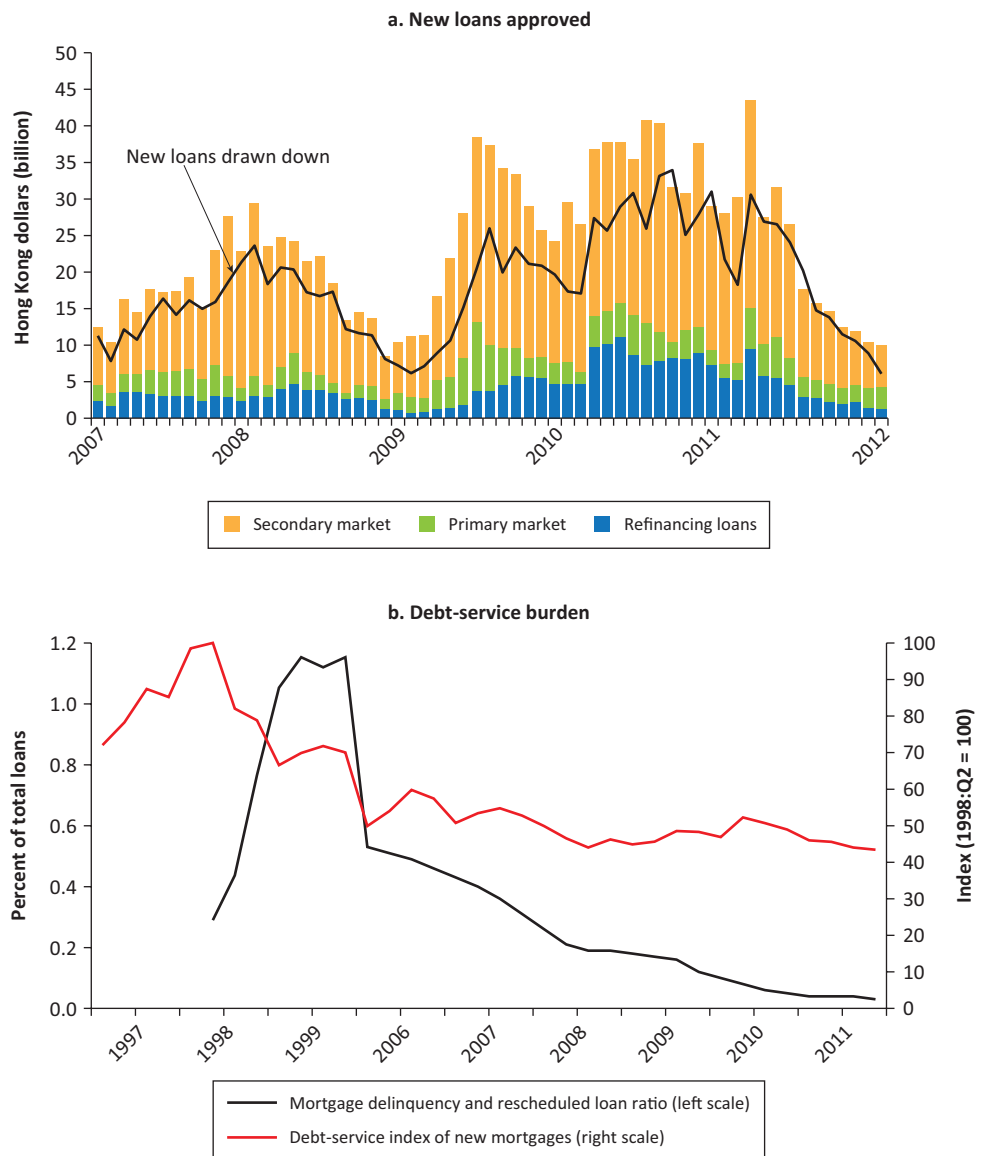
Figure 2.3. Hong Kong SAR: Banks' Regulatory Reserves



Source: Hong Kong Monetary Authority.

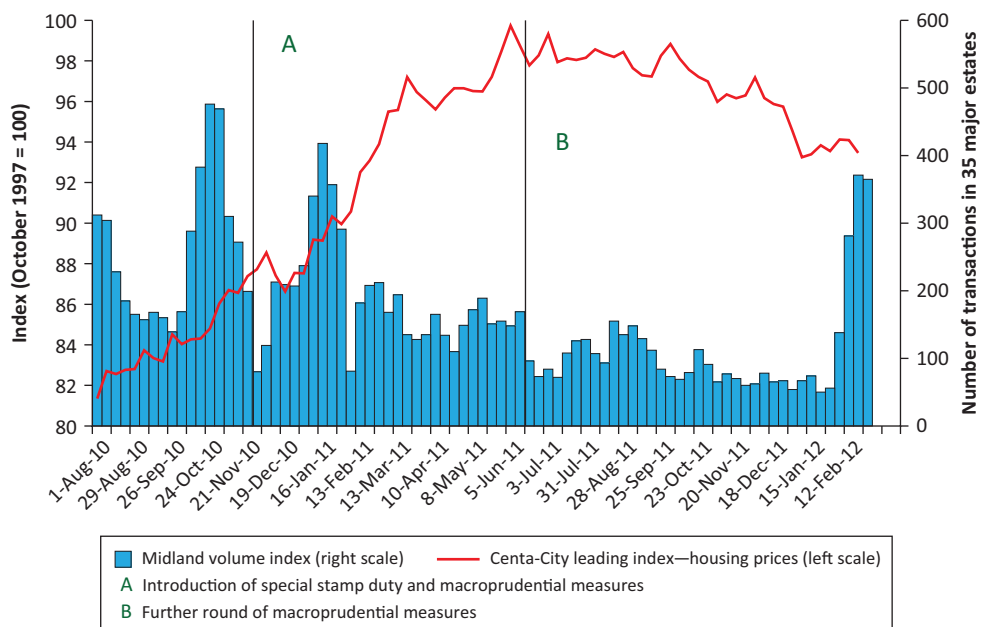
Regarding the property market, property prices as shown in Figure 2.5 appeared to have declined moderately since September 2011. For property transactions, the blue bar in Figure 2.5 suggests an obvious reduction in the transaction volume after the implementation of the special stamp duty. This stage shows some early signs of intended policy effects on the market. It will take observation over a longer period to assess the overall effectiveness of the measures for containing risks in the banking system.

Figure 2.4. Hong Kong SAR: Mortgage Lending and Debt-Servicing Burden



Source: Hong Kong Monetary Authority.

Figure 2.5. Hong Kong SAR: Property Market Activity



Source: Hong Kong Monetary Authority.

Note: In Hong Kong SAR, an “estate” is a cluster of high-rise residential buildings

Macroprudential Policy Instruments in Singapore

NG CHUIN HWEI

This section sets out some views about macroprudential policy instruments in Singapore and describes Singapore’s recent experience in implementing demand-side and supply-side policy measures for the property market.

Singapore’s use of macroprudential instruments has centered on the housing market, based on the systemic risks it could pose. Systemic risk from the property sector could manifest itself through two channels—the credit and leverage risk channel⁴ and the asset-price inflation risk channel.⁵ The policy

⁴ If property values fall because of a downturn in the property market, households would suffer a negative wealth effect. Slowdowns in the housing market are usually accompanied by a general economic slowdown, wages fall or growth decelerates and unemployment rises. These effects, combined with the negative wealth effect, would reduce households’ debt-servicing ability, thus increasing the credit risk to financial institutions. Faced with declining asset quality, banks would reduce credit to households, which in turn would reduce aggregate demand for housing. This feedback loop would exacerbate the property market downturn, the negative effect on households, and ultimately the impact on financial institutions.

⁵ The diminished value of property collateral in a housing market downturn would mean a decline in recovery values from borrowers who default. In addition, a large decline in the value of collateral would discourage financial institutions from extending credit to new borrowers. Reduced credit to housing market participants, in turn, would drag down the housing market, which together with reduced demand from households, could potentially contribute to a downward spiral in property prices.

objectives served by the macroprudential instruments are to promote a stable and sustainable property market in which prices move in line with economic fundamentals, encourage greater financial prudence among property purchasers, and maintain sound lending standards.

A range of macroprudential instruments has been used to address systemic risks posed by the housing market. These instruments operate through different channels and may be implemented by different authorities. The term “macroprudential” is less a defining characteristic of a certain group of instruments than a description of how a policy instrument might be used to target systemic risks. Some of the policy measures commonly used could be seen as microprudential measures wielded in a macroprudential way: they mitigate risks at the individual institution level, but when applied across institutions, serve to mitigate risk at the systemic level. Other policy instruments, even nonprudential measures like transaction taxes and supply-side measures, can have macroprudential objectives and effects.

Targeting Segments and Sectors Causing Systemic Risk

The heterogeneity of macroprudential instruments offers the policymaker versatility in using these instruments in targeted and specific ways. In contrast, the experience with monetary policy suggests that the use of broad policy instruments like exchange rates and interest rates may result in unintended spillover effects and their impacts are often subject to long and variable lags before affecting asset markets. Such broad policy tools may not afford sufficient precision if policymakers want to address systemic risks that originate from specific sectors (such as the housing market) without adverse spillover effects on other developing sectors of the economy. In Singapore’s case, macroprudential policies have been targeted at the housing sector.

Targeting Different Groups of Buyers

This targeted approach is also reflected in the way the measures are calibrated to target demand from three different customer segments: property speculators, investors, and other buyers. For instance, the seller stamp duty, with higher tax rates for resales within a shorter period, aims to discourage short-term speculative purchases. Lowering the loan-to-value ratio for non-individual buyers—and for those with more than one outstanding housing loan—targets property investors without affecting first-time home owners, whereas lowering the loan-to-value ratio for all buyers has a greater impact on overall demand.

Targeting Different Risks

Adopting a targeted approach does not mean that macroprudential instruments should be pigeon-holed into a narrow “one tool–one policy objective” model. Indeed, a single policy tool like loan-to-value ratios could address multiple risks. For instance, loan-to-value ratios can encourage financial prudence among borrowers and provide a buffer for banks should prices correct. This helps address systemic credit and leverage risk concerns in cases in which excessive credit growth could affect banks’ asset quality and high leverage could leave banks with insufficient buffers against sudden turns in the market. Loan-to-value ratios also simultaneously serve to moderate asset-price inflation to the extent that it is driven by credit growth. This helps address asset-price inflation risk when a decline in sentiment could lead to rapid price corrections that could pose potential financial stability risks (e.g., through an adverse impact on the asset quality of property-related loan exposures and the devaluation of property collateral).

Targeted demand-side macroprudential measures like loan-to-value ratios and seller stamp duties have generally been preferred for dealing with exuberance in the short term, given that supply-side measures operate with a greater lag and are not easily reversed. Nonetheless, supply-side measures like land sales are important for mitigating asset-price inflation by addressing any fundamental mismatch between demand and supply. At the same time, demand-side and supply-side tools indirectly address the credit and leverage risk channel by moderating price increases and thereby potential strains on household debt-servicing ability.

Conclusion

In adopting macroprudential policies, Singapore, like other economies in Asia, has taken a targeted approach. Instead of relying on a single instrument, several tools have been used simultaneously. Together, these instruments have proved useful in limiting excessive leverage and promoting prudent borrowing and lending behavior, in turn, mitigating the risk of disruptive price adjustments. The experience so far suggests that macroprudential tools offer policymakers considerable flexibility, and that the trade-offs involved in macroprudential policy may not be as restrictive as in a one tool–one policy objective paradigm.

Incorporating Macroprudential Instruments into Monetary Policy: The Indonesian Experience

JUDA AGUNG

A crisis always brings new lessons for central banks. The economic downturn during the Great Depression of the 1930s placed central banking under the

control of fiscal authorities for nearly two decades afterward. The Great Inflation of the 1970s had the opposite effect, restoring independence into central banking. High inflation in the early 1980s caused central banks to establish monetary policy frameworks solidly anchored by price-stability mandates and safeguarded by independence. The Asian crisis of the late 1990s also led to Asian central banks, including those of Indonesia, the Republic of Korea, the Philippines, and Thailand, to adopt inflation targeting frameworks after the collapse of exchange rate bands.

The 2008–09 global economic and financial crisis and its subsequent events also highlight some important issues about the role of the central bank in the macroeconomy and the way monetary policy should be conducted (Taylor, 2009). The financial crisis paradoxically occurred during a time when the global economy managed to achieve its best performance in maintaining price stability and economic growth. Although this golden age of inflation targeting contributed to low inflation, the narrow focus on price stability failed to account adequately for financial sector risks.

The key lesson from the recent crisis is that central banks should explicitly and systematically consider financial sector risks when setting monetary policy. Although monetary policy should focus on price stability, central banks should also have a set of macroprudential instruments for dealing with financial stability. However, because monetary policy and macroprudential policy reinforce each other, policy actions must be coordinated to get an optimal policy result. Furthermore, in some cases, the two policies may be required to be implemented in tandem. Recent Indonesian experience with large and volatile capital flows has been an example of the need for a policy mix between monetary and macroprudential policies.

This section highlights the post–global crisis monetary policy framework in Indonesia, highlighting how to incorporate macroprudential instruments into the monetary policy framework. Bank Indonesia’s recent experience in implementing a mix of monetary and macroprudential policies is also discussed.

Precrisis Monetary Policy Framework

Mishkin (2011) argues that there are nine basic scientific principles, derived from theory and empirical evidence, that guide thinking at almost all central banks: inflation is always and everywhere a monetary phenomenon; price stability has important benefits; there is no long-term trade-off between unemployment and inflation; expectations play a crucial role in the determination of inflation and in the transmission of monetary policy to the economy; real interest rates need to rise with higher inflation (the Taylor Principle); monetary policy is subject to the time-inconsistency problem;

central bank independence helps improve the efficiency of monetary policy; commitment to a strong nominal anchor is central to producing good monetary policy outcomes; and financial friction plays an important role in business cycles.

The monetary policy strategy referred to as flexible inflation targeting (Svensson, 1999) was, in fact, built on the first eight principles of the new neoclassical synthesis. It involves a strong, credible commitment by the central bank to stabilize inflation in the long term, but also allows output to stabilize around its natural rate in the short term.

Many central banks have adopted inflation targeting frameworks since 1990. The framework advances two main rules. First, inflation and output gap forecasts should be viewed as summary statistics of the state of the economy. Second, the policy instrument should be fine-tuned so that inflation forecasts are stabilized and output volatility is minimized. However, limiting the information set to inflation forecasts and the output gap can be highly misleading. Output gaps have long been known to be ill defined and subject to a great deal of measurement error.

The Central Bank Act of 1999 gave Bank Indonesia independence and a mandate to pursue currency stability.⁶ From 2000 to 2004, Indonesia implemented some form of inflation targeting, with a role for output stabilization and base money as an operational target.⁷ Regimes such as these are sometimes referred to as “inflation targeting lite” because they are eclectic and incorporate some, but not all, of the key features of inflation targeting (Stone, 2003). The amendment of the Central Bank Act in 2004 provided a clearer framework in which the inflation target is set by the government and monetary policy is guided by the target. Since 2005, Bank Indonesia has adopted full-fledged (flexible) inflation targeting and has used Bank Indonesia’s rate as the policy rate.

Empirically, evaluations of the implementation of inflation targeting in Indonesia since 2004 have recorded a number of noteworthy outcomes (Juhro and others, 2009). Despite missing the targets in 2005, 2008, and 2010, primarily as the result of supply shocks (oil shocks and the food price shock), the framework successfully strengthened the monetary policy decision-making process; improved monetary policy signals to influence inflation expectations and thus accelerate the transmission mechanism of monetary policy (Satria and Juhro, 2011); and improved the policy credibility of the

⁶ Currency stability refers to both price stability and exchange rate stability. But, in practice, Bank Indonesia puts more weight on price stability (controlling inflation).

⁷ See Alamsyah and others (2001) for the early implementation of inflation targeting in Indonesia.

central bank as demonstrated by the declining sacrifice ratio, representing an imperfect measure of the trade-off between inflation and aggregate output.

Postcrisis Monetary Policy Framework: Toward Integration of Macroprudential Instruments into the Monetary Framework

Before the 2008–09 global economic and financial crisis, the common wisdom was that achieving price and output stability would promote financial stability. Bernanke and Gertler (2001), for example, argued that monetary policy, which optimally stabilizes inflation and output, is likely to stabilize asset prices, making asset-price bubbles less likely.

The crisis, however, revealed that maintaining low inflation alone, without taking into account financial stability, is insufficient for achieving macroeconomic stability. This lesson is not new for Asian central banks. A number of crises that have occurred in recent decades showed that macroeconomic instability is primarily rooted in financial crises. Financial markets are inherently imperfect and potentially create excessive macroeconomic fluctuations if not well regulated. Therefore, the key to managing macroeconomic stability is not only managing internal and external imbalances, but also imbalances in the financial sector, such as excessive credit growth, asset-price bubbles, and the cycle of risk-taking behavior.

The recent crisis clearly demonstrates that benign economic environments may promote excessive risk taking and may actually make the financial system more fragile (Gambacorta, 2009). Although price and output stability are surely beneficial, a policy focused solely on these objectives may not be enough to produce good economic outcomes. It is clear that during the global crisis, price stability may have encouraged the accumulation of risk in the financial sector, such as excessive credit growth and asset-price bubbles (Blinder, 2010). Stable macroeconomic conditions reflected in a long period of low interest rates created moral hazard among market participants against macroeconomic risks. Investors felt that the macroeconomic risk was already guaranteed by the credible central bank; therefore, they tended to seek higher yields in higher risk assets.

Does inflation targeting remain relevant? Mishkin (2011) argues that none of the lessons from the financial crisis in any way undermines or invalidates the nine basic principles of the science of monetary policy developed before the crisis. The lesson that developments in the financial sector can have a large impact on economic activity does indicate that the ninth principle on the role of financial frictions in creating macroeconomic fluctuation is, of course, valid, but now is even more important than central bankers previously realized. According to this line of thinking, the inflation targeting framework should incorporate macroprudential features to support monetary and financial system stability.

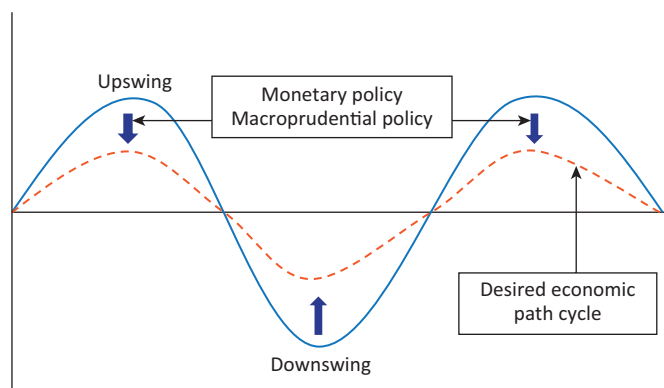
How to Integrate Flexible Inflation Targeting and Macroprudential Policy

The principle behind the integrating macroprudential policy into inflation targeting is that because the financial sectors are inherently procyclical and procyclicality aggravates macroeconomic fluctuations, countercyclical monetary and macroprudential policies should be mutually reinforcing (see Figure 2.6). Macroprudential measures, such as countercyclical capital asset ratios, to reduce excessive credit growth, for example, could support monetary policy by cooling down the overheating economy without excessively tightening monetary policy. This method is particularly needed during periods of large capital flows when monetary policy is facing a dilemma (Agung, 2010).

For its part, monetary policy can support financial stability by a (mild) reaction of interest rates to excessive risk behavior in the financial sector. The existence of the risk-taking channel of monetary policy clearly supports the view that monetary policy should lean against the build up of financial instability. Support from monetary policy is also necessary given that heavy reliance on macroprudential policy may also foster undesirable outcomes, such as limiting credit availability and causing financial disintermediation (Agénor and da Silva, 2012).

The efficacy of policy coordination depends upon the macroeconomic environment, financial conditions, and the intermediation process, as well as the levels of capital and assets in the banking system. Therefore, it is unrealistic to expect a combination of monetary and macroprudential policy to eliminate the economic cycle in its entirety. The overarching goal of policy integration is to manage the cycle and augment financial system resilience on a macro scale.

Figure 2.6. Monetary and Macroprudential Policy to Dampen Procyclicality



Source: Author's calculations.

Given that this area is still uncharted territory, efforts should be made to improve the understanding of the link between monetary and macroprudential policy. The following agenda should be outlined in central banks:

- First, how the monetary and macroprudential policy transmission mechanisms affect economic activity must be understood, which requires a more integrated analysis framework, particularly for calculating the significant role of the financial sector.
- Second, accurate measurement of the risks of financial imbalances is needed. Such indicators will also strengthen analysis of the transmission mechanism through the risk-taking channel. For example, Basel III recommends use of the credit-to-GDP gap to measure the financial cycle.
- Third, a macroeconomic model that incorporates the financial sector needs to be developed to better understand the link between macroeconomic and financial sector issues and to guide policy decisions. Bank Indonesia is currently developing a core model that includes the financial sector.
- Fourth, from an institutional perspective, coordination among the different agents is necessary to make the policy mix effective, particularly if responsibilities for microprudential, macroprudential, and monetary policies are institutionally separated. In Indonesia, a new Financial Services Authority (FSA) Act clearly states that microprudential regulation is under FSA jurisdiction and macroprudential regulation is under the jurisdiction of Bank Indonesia. Furthermore, FSA should coordinate with Bank Indonesia in issuing regulations related to capital, foreign borrowing, derivative products, and systemically important banks.

Managing Capital Flows: Integrating Monetary and Macroprudential Policies

A two-speed global economic recovery since 2009 has created massive capital flows, which have posed a number of challenges for emerging countries like Indonesia. Although recipient countries have benefited from the inflows through financial deepening and wider sources of financing, capital flows have also elicited various challenges in the recipient countries.

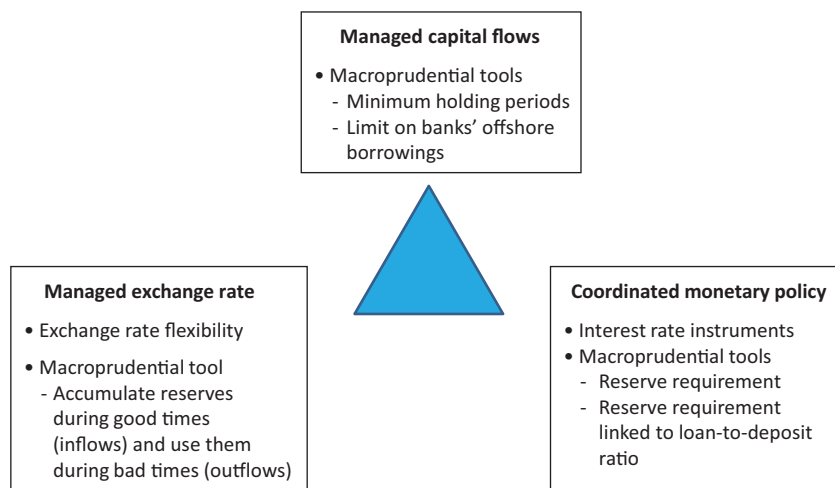
Capital flows have put pressures on domestic currency appreciation, accelerated economic overheating, triggered asset-price bubbles, and intensified the risk of financial system instability. Speculative capital inflows could create economic vulnerabilities to changes in investor sentiment,

primarily through changes in asset prices and the exchange rate, and maturity mismatches. This is a version of the classic impossible trinity of monetary policy in a small open economy.

To confront this issue, Bank Indonesia’s policy has been to strike an optimal balance among the three objectives by adopting a policy mix that integrates monetary and macroprudential policies (see Figure 2.7).

- First, Bank Indonesia has allowed some room for nominal exchange rate appreciation in response to the wave of inflows. Although the appreciation has helped reduce inflation stemming from import prices, foreign exchange intervention is also needed to avoid a large misalignment and excessive volatility in the exchange rate. Considering that the inflows are highly vulnerable to the risk of reversal, the intervention also allows the central bank to build up foreign reserves during good times and use them during bad times (the possible reversal).
- Second, to contain excessive short-term capital flows, the central bank has issued some macroprudential regulations to mitigate excessive volatile flows by “throwing sand in the wheels.” These regulations include requiring investors to hold Bank Indonesia Certificates (SBI, for Sertifikat Bank Indonesia) for six months, reinstating limits on short-term offshore bank borrowing, and increasing the foreign exchange reserve requirement ratio. These policies have encouraged the diversification of foreign portfolio capital flows, and reduced risks of excessive foreign borrowing by banks.

Figure 2.7. Managing the Trilemma in Indonesia: Incorporating Macroprudential Measures into the Monetary Framework



Source: Author.

- Third, the loss of monetary policy freedom as a result of rapid inflows can partly be resolved by adopting a macroprudential policy to absorb excess liquidity in the economy to mitigate the risks of an asset-price bubble. The actions in this policy include an increase in the statutory reserve requirement and the maintenance of financial stability through a macroprudential policy encouraging banks to manage credit and liquidity risks through a loan-to-deposit ratio–linked reserve requirement. This type of macroprudential policy is effective if banks play a major role in intermediating capital flows. However, if the capital flows emanate directly from unregulated sectors, such as direct loans from the private sector, measures to control capital inflows, for example, by limiting private loans, are another option.

Conclusion

In the current post–global crisis era, the monetary policy framework in Indonesia needs to be strengthened. The core element should still be a focus on price stability. However, the new framework should incorporate macroprudential policy for two reasons. First, highly procyclical movements in financial sectors warrant an integration of monetary and macroprudential tools for countercyclical policy. Second, in a small open economy, like Indonesia, monetary authorities often face dilemmas, especially during periods of large and volatile capital flows, thus support from macroprudential policy can be beneficial in maintaining both price stability and financial stability, as evidenced in recent years.

Efforts should be made to ensure the new framework works well. These efforts should include attaining a better understanding of the transmission mechanism of macroprudential policy. At the institution level, coordination among authorities, in particular, monetary and macroprudential authorities and the microprudential regulator, should be strengthened, although in practice this may be easier said than done.

See Table 2.1 for a summary of Indonesia’s macroprudential measures.

Putting the “Macro” into Macroprudential: The Israeli Experience⁸

BARRY TOPF

Macroprudential is messy. Every discussion of “macroprudential” quickly runs into difficulties of definition, delineation, and categorization. It does

⁸ The author would like to thank staff of the Market Operations Department, Research Department, and Supervisor of the Banks for assistance in preparing data and for their excellent work in macroprudential policy.

Table 2.1. Post-Global Crisis Macroprudential Policy Measures

Measure	Objectives
Minimum holding period on Bank of Israel (BI) bills (one month in 2010, changed to six months in 2011)	<ul style="list-style-type: none"> • “Throw sand in the wheels” of short-term and speculative capital inflows • Mitigate the risk of sudden reversals.
Shift BI bills to term deposits as of June 2010	<ul style="list-style-type: none"> • Lock up domestic liquidity for a longer term • Limit the supply of BI bills on the market
Reinstate limits (maximum of 30 percent of capital) on the short-term offshore borrowing of banks, effective end-January 2011	<ul style="list-style-type: none"> • Limit short-term and volatile capital inflows • Limit the foreign exchange exposure of the banking system that stems from capital inflows
Increase foreign exchange reserve requirements of the banks from 1 percent of foreign exchange deposits to 5 percent effective March 2011 and 8 percent effective June 2011	<ul style="list-style-type: none"> • Strengthen foreign exchange liquidity management, and thereby the resilience, of the banking system in confronting increasing foreign exchange exposure emanating from capital inflows • Help absorb domestic liquidity
Increase rupiah reserve requirement from 5 percent to 8 percent, effective November 2010	<ul style="list-style-type: none"> • Absorb domestic liquidity and enhance liquidity management by the banks without exerting negative impacts on the lending that is required to stimulate growth
Lengthen (from weekly to monthly) auctions and offer longer-maturity (3, 6, and 9 months) BI bills as of June 2010	<ul style="list-style-type: none"> • Enhance the effectiveness of domestic liquidity management, including from capital inflows, by locking up domestic liquidity for a longer term and helping develop domestic financial markets

Source: Author’s compilation.

not fit neatly into categories—theoretical, organizational, or operational. It is hard to quantify, lacks benchmarks, and cuts across numerous areas of responsibility. Models are hard to come by and unsatisfactory. It is extremely country specific. Success is frequently unobservable whereas failure is immediately and painfully obvious. It has few tools that are exclusively its own, but borrows them from other areas—and even its name is a hybrid borrowed from more clearly defined aspects of economic policy.

This ambiguity is perhaps most succinctly summarized in the question posed at the very beginning of one recent paper on macroprudential policy, which can be paraphrased as “is the goal of macro-prudential to protect the banks from the economy or to protect the economy from the banks?” (Bank of England, 2009).

However, it is this very complexity, along with its importance, that makes the successful design and implementation of macroprudential policy so challenging, so interesting, and in many ways the toughest test a central bank will face—a comprehensive “final exam” for central bankers. To succeed,

the central bank must meet multiple goals using multiple tools in a dynamic and risky environment. Macroprudential means tying together areas and operations both within and outside of the central bank, that are not used to working together, to meet common goals in a holistic fashion.

This is because the “macro” in macroprudential stands for macroeconomic as well as macroprudential. The initial innovation in macroprudential policy was moving from microprudential—ensuring the stability of a single institution—to ensuring the stability of the financial system as a whole. That is clearly a major and vital advance. But macroprudential policy should also aim at ensuring stability of the economy as a whole, including price stability. Specifically, monetary policy and macroprudential policy are complementary, in a triangular relationship:

- Macroprudential should ensure systemic financial stability.
- Macroprudential should support price stability by assisting monetary policy.
- Monetary policy should support systemic stability through integration with macroprudential.

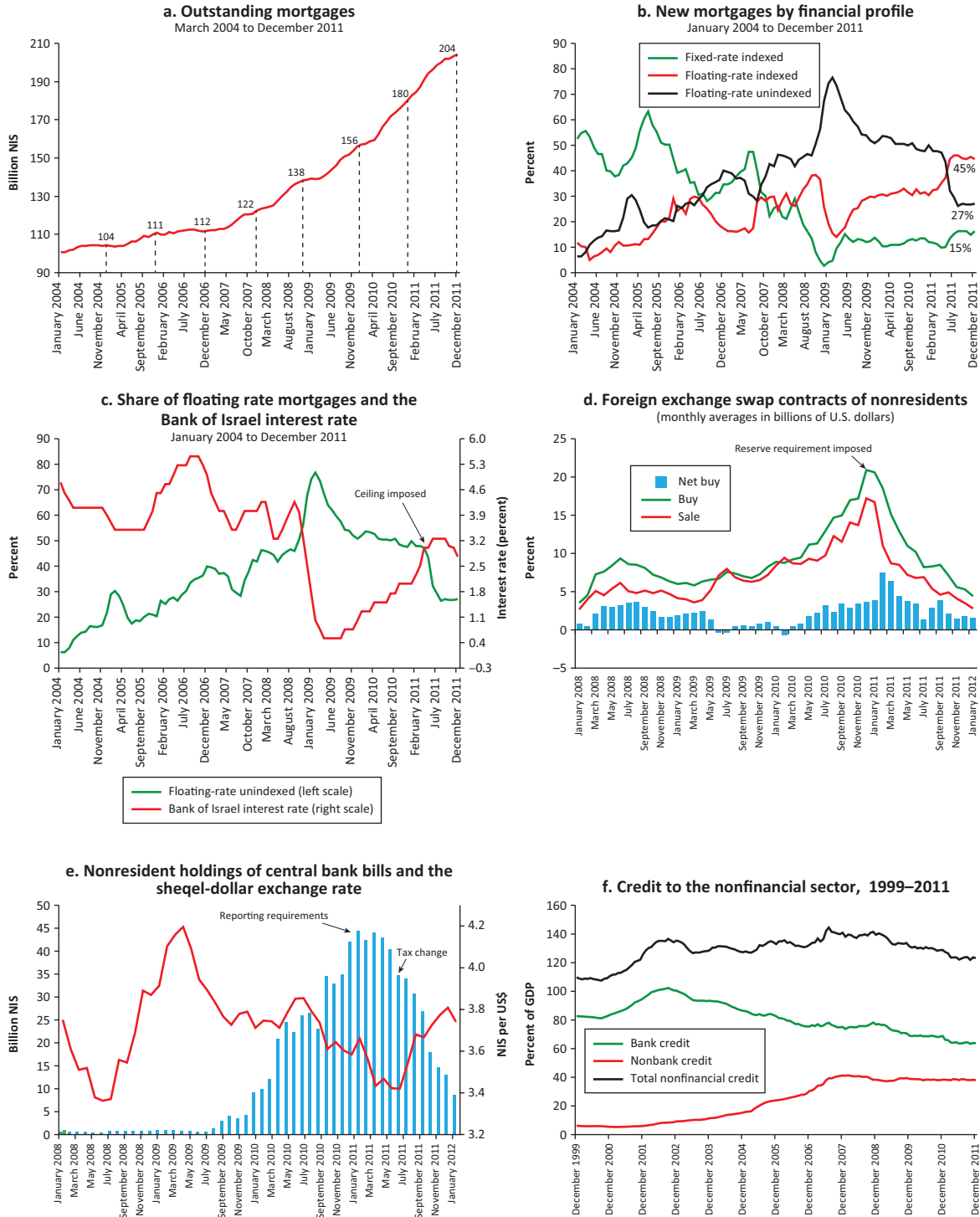
The first point is obvious, and the second point is gaining acceptance. However, the third point is less clear, and possibly even somewhat controversial, so this section focuses on that, and uses experience in Israel to illustrate.

Example 1. Macroprudential Measures in the Mortgage Market—An Evolving Policy

The share of owner-occupied housing in Israel is high (69 percent, with mortgage loans comprising 70 percent of household debt and 25 percent of all bank credit; all figures for year-end 2011). All mortgages are full recourse, and are usually extended by the five largest banks in a very concentrated banking market. Historically, default rates have been extremely low.

In the wake of record low interest rates reached in response to the 2008–09 financial crisis, along with low returns on alternative investments and their higher perceived risks, the volume of new mortgages increased significantly, from an average yearly growth rate of 5 percent earlier in the decade to 13.2 percent in 2010 (Figure 2.8, panel a). Housing price increases accelerated, and concerns of a possible bubble in the housing market surfaced. Significantly, the composition of mortgages changed dramatically, with the share of

Figure 2.8. Israel: Confronting Financial Risks



Source: Bank of Israel.

Note: NIS = new Israeli sheqel.

long-term fixed-rate⁹ mortgages falling from more than 50 percent of new mortgages in 2004 to less than 10 percent in 2009, while the share of non-indexed floating-interest-rate mortgages rose rapidly from less than 10 percent of mortgage origination in 2004 to a peak of more than 75 percent in mid-2009 (Figure 2.8, panel b). In August 2009, the Bank of Israel began raising interest rates from a record low of 0.50 percent and the share of floating rate mortgages began to decline, but remained about half of all new mortgages from the end of 2009 until mid-2011 (Figure 2.8, panel c).

The increased share of floating-rate mortgages raised a number of serious and interrelated concerns in the central bank. The first issue was a traditional microprudential issue regarding the stability of the banks that were extending floating-rate mortgages. Although, as noted, mortgage lending was traditionally considered very low risk, these were a new form of mortgage that included for the first time substantial interest rate exposure for the borrowers. Both lenders and borrowers lacked experience and historical data, so it was not clear that the reliance on past low default rates was justified. Moreover, a floating-rate mortgage was most attractive, and most easily marketable, when rates were low but there was a high probability of interest rate increases over the lifetime of the mortgage, bringing much higher monthly repayments and payment-to-income ratios. Consumer protection and conduct of business were also concerns.¹⁰

For a number of reasons, concern soon increased that the extremely rapid growth in floating-rate mortgages could pose systemic risks as well. Obviously, the extremely rapid growth of a new instrument with new and possibly underappreciated risks in almost all banks at the same time, constituting a growing portion of all bank credit, meant that it was inherently a system-wide issue. Moreover, the new and primary risk factor—interest rate exposure—was common across the sector, and difficult for the system to hedge or diversify. A period of rising interest rate risks might bring higher default rates, which would be highly correlated across institutions given that they shared a common principle risk factor. Rapid growth in this new type of mortgage and its share in total bank credit were peaking just as interest rates were at a historical and cyclical low.

⁹ Until 2009, almost all mortgages in Israel (and many contracts) were indexed to the consumer price index (CPI). Therefore, a fixed-rate mortgage refers to a fixed (real) interest rate but linked to the CPI, whereas a floating-interest-rate mortgage refers to an unlinked mortgage for which the nominal interest rate is derived from the Bank of Israel policy interest rate.

¹⁰ The Supervisor of Banks in the Bank of Israel took a number of steps to mitigate the risk of borrowers assuming unsustainable mortgage burdens: requiring banks to detail to the borrower the increase in payments under various scenarios, increased reporting requirements and inspections, and the like. These had little overall impact; it appears that the attraction of lower monthly payments upfront more than offset the risk of much higher payments in the future.

Moreover, the risk in mortgage loans could be highly correlated with another major part of banks' credit portfolios—construction loans. Residential construction in Israel is funded to a significant degree by builders selling units before they are actually built. Builders are essentially funded through mortgages taken by buyers, in addition to the loans they take directly. Thus, a rapid increase in interest rates would lead to more expensive mortgages, a decrease in demand for housing, and an inability of builders to fund themselves through the pre-sale of units, all of which would increase their risk. Because banks also had large exposures to construction firms through direct lending, two major parts of the credit portfolio—residential mortgages and construction loans—would be highly correlated.¹¹

Another concern was that the banks would face increasing default risk on floating-rate mortgages due to a rising interest rate environment just as funding difficulties were increasing generally. Given the inherent mismatch between the long-term asset in mortgages and their short-term interest rate exposure, this was a special concern in the case of floating-rate mortgages.

Clearly, the rapid growth in this sector raised a number of prudential concerns. Significantly, it also posed serious challenges for monetary policy. One concern was that with a large portion of new mortgages having floating interest rates, the impact of changes in the monetary policy rate would be considerably amplified. Even though this could have advantages, in certain situations it could present the central bank with difficult dilemmas. For example, consumer price inflation and overall economic activity might suggest room for lower interest rates—yet concern over high housing costs and the possibility of feeding an asset boom could restrain the Bank of Israel's policy choices. Conversely, the bank's options might be limited if otherwise justified rate increases might pose the danger of a sudden stop in mortgage origination and rapid increase in defaults, potentially damaging financial stability as well as a vital sector of the economy.

Another side effect of the increased sensitivity of the housing market to short-term interest rates was the impact on inflation as measured by the consumer price index (CPI). Although the CPI is based on the imputed cost of housing services, the variable relationship between rental housing costs (which affect the CPI) and the price of housing could introduce significant volatility in the inflation rate, complicating monetary policy.¹²

Beginning in 2010, the Bank of Israel took a number of regulatory steps to reduce risks in the mortgage market, including

¹¹ Together they reached close to 40 percent of total bank credit.

¹² Israel has an inflation targeting regime; the Bank of Israel is mandated to keep inflation within a 1–3 percent range for a horizon not exceeding two years.

- requiring a supplemental loan loss provision of 0.75 percent on mortgages with a loan-to-value ratio exceeding 60 percent;
- applying a 100 percent risk weighting on mortgages with loan-to-value ratios of 60 percent or more and a floating rate portion on 25 percent of the total loan;¹³
- intensifying reporting requirements; and
- enhancing on-site and off-site reporting.

These steps served a clear purpose in reducing risks at both the institutional level and system wide. However, their impact on the actual volume of floating-interest-rate loans was limited once they were priced in by the market. Moreover, the strong link between monetary policy steps and developments in the housing market remained, albeit at a lower level. Although the traditional purpose of macroprudential policy was partially achieved—reducing risks to the financial system—the additional goal (supporting monetary policy) was not. The need for additional action was apparent.

In May 2011, the Bank of Israel imposed a ceiling limiting the floating rate component of mortgages to one-third of the total loan. The impact was clear: the share of floating-rate mortgages dropped significantly while interest rates remained stable, and remained at lower levels even after the Bank of Israel resumed lowering interest rates in the second half of 2011 (Figure 2.8 panel c).

Although it is still early, the impact of the May 2011 ceiling appears to be a weakening of the automatic and mechanical link between the policy interest rate and mortgage rates, which could in certain situations limit the Bank of Israel's ability to implement monetary policy, or lead to potentially unacceptable side effects of that policy. So far, the appropriate macroprudential steps have not only met their direct goal of strengthening systemic stability, but have also supported and strengthened monetary policy.

Example 2. Supporting Exchange Rate Policy

Beginning in 2007, the exchange rate of the Israeli sheqel appreciated rapidly. In March 2008, the Bank of Israel began to intervene in the foreign exchange market, deviating from a 10-year policy of nonintervention. By the beginning of 2011, the bank had purchased US\$44 billion, increasing reserves from

¹³ This applied only to mortgages above 800,000 Israeli new sheqalim.

US\$29 billion in 2008 to US\$70 billion at the end of 2010. Because further intervention was becoming ever more difficult and costly, the bank sought supporting measures. The first measure implemented was the imposition of a reserve requirement on foreign exchange swap and forward transactions.

Data routinely reported to the Bank of Israel showed that a considerable portion of purchases of Israel sheqalim against foreign currency were by means of forward or swap contracts, rather than outright spot purchases. Using a derivative contract had numerous advantages for those wishing to obtain a financial exposure to the exchange rate without necessarily having any “real” need for or exposure to the Israeli currency, economy, or financial system. Moreover, the leverage inherent in these transactions allowed market participants and financial intermediaries (primarily Israeli commercial banks) to take larger positions than they might have otherwise. The rapid increase in the volume and exposure to these instruments in itself raised prudential concerns.

In January 2011, the Bank of Israel imposed a 10 percent reserve requirement on all foreign exchange derivative transactions of nonresidents with an Israeli bank. Because the reserve requirement is unremunerated, this was estimated to be equivalent to an increase in the cost of transactions of close to 10 basis points.

The impact was significant. Outstanding foreign exchange derivative transactions by nonresidents contracted rapidly (Figure 2.8, panel d). In addition to the effect of the direct increase in costs, the contraction was attributed to a strong signaling effect—the market saw that the central bank had, and would use, other tools at its disposal to achieve its policy objectives. Because of the other factors involved, it is difficult if not impossible to isolate the impact of a single step, but the direction was clear.

It was apparent from the beginning that the reserve requirement would be limited to a supporting role. First, it was evident that the impact of the step would diminish over time, because the market found ways to circumvent the reserve requirement, either by transacting offshore or by transacting with nonbanks financial institutions not subject to reserve requirements. Moreover, the possibility of contributing to disintermediation of the banking system, and even to the growth of shadow banking, was seen as a significant potential drawback, and was one of the factors in limiting the size and extent of the reserve requirement.

In summary, it appears that the reserve requirement played a small but positive role in reducing undesirable pressure on the exchange rate as well as lessening potential risks to financial market stability, thus, it was a useful addition to the central bank’s macroprudential toolkit.

Example 3. Supporting the Exchange Rate—Further Steps

As part of its efforts to alleviate unwarranted appreciation pressure on the Israeli sheqel, the Bank of Israel sought ways of introducing some friction into the financial markets, to “throw some sand into the wheels.” Here, too, the goals were twofold: to dampen pressure on the exchange rate while reinforcing financial market stability. Unequal conditions and underpriced risks could contribute to the buildup of destabilizing flows and positions. Developments in the central bank bill (Makam) market were a case in point.

For many reasons, Makam became the instrument of choice for nonresidents who were able to take a cash position in the domestic currency. Along with natural advantages (good liquidity, free of credit risk) there was an aberration—nonresidents were exempt from taxes on Makam and government bonds. (The exemption remained from when government policy was aimed at attracting foreign investment into Israel and expanding undeveloped financial markets.) By 2011, with Israel facing large capital inflows complicating monetary policy, it was difficult to justify maintaining that policy.¹⁴ Because tax policy was the responsibility of the ministry of finance, the Bank of Israel urged the government to remove the tax benefit granted to nonresidents, creating a more level playing field. The ministry agreed and announced its intention to introduce the necessary legislation.¹⁵

Because the tax changes would take time to be implemented, in January 2011 the Bank of Israel announced its intention to impose a reporting requirement for all Makam transactions involving nonresidents. After a relatively short consultative process with market participants, the bank implemented the reporting requirement. Although the reporting requirements were not particularly onerous, and there were no restrictions, prohibitions, or explicit costs (other than those involved in compiling the reports), they had a distinct impact on the market for Makam and indirectly on the exchange rate (Figure 2.8 panel e).¹⁶ One factor was the regulatory and compliance burden involved. Beyond that, there was a significant signaling effect—the market perceived the move as signaling the central bank’s determination and ability (and perhaps preparations) to take further, unconventional actions to meet its policy goals.

¹⁴ Another concern was the possible impact on the Makam market (and its role as a monetary tool) of large holdings by nonresident, less-stable holders of the bills.

¹⁵ Israel has double taxation treaties with most relevant countries, so most foreigners would not, in fact, have incurred any final tax liabilities in Israel. However, the reporting and filing complications involved in obtaining exemptions proved to be as much of an obstacle as the actual tax.

¹⁶ The announcement explicitly stated that the reporting was to be used only for data gathering and analytical purposes, and to assist in monitoring market developments.

Example 4. Possible Financial Stability Implications of Low Interest Rates

The debate concerning the role of low interest rates in the recent crisis, or in contributing to financial instability, asset bubbles, or misallocation of resources, is far from resolved and highly contentious. There is good reason to consider seriously the possibility outlined in the following:

It would be a delusion to expect that a macroprudential framework on its own could ensure financial stability . . . monetary policy is key . . . Monetary policy sets the universal price of leverage in a given currency area, and as such is harder to circumvent. It operates precisely by influencing credit and asset prices and as such is more likely to act as an effective speed limit. And, as increasing evidence suggests, it can influence risk perceptions and attitudes—the price of risk—and complement macroprudential tools. (Borio, 2011b, p. 17)

Given that no definitive conclusion has been reached, it might be wise for policy to err on the side of caution, with a reasonable assumption being that if there are negative side effects of low interest rates, they will become more and more pronounced as rates approach the zero bound.

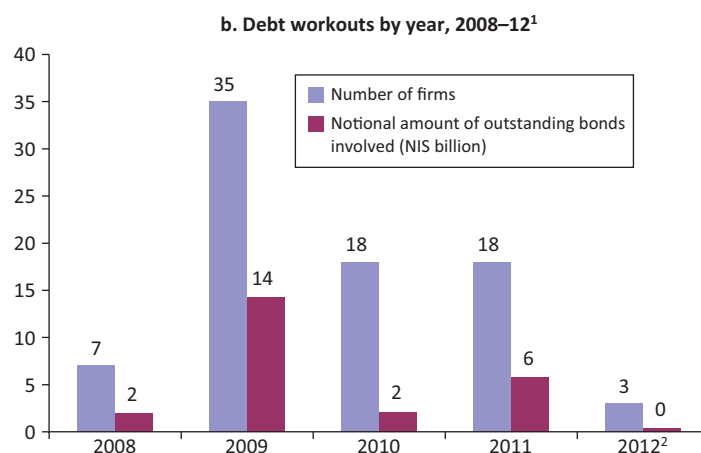
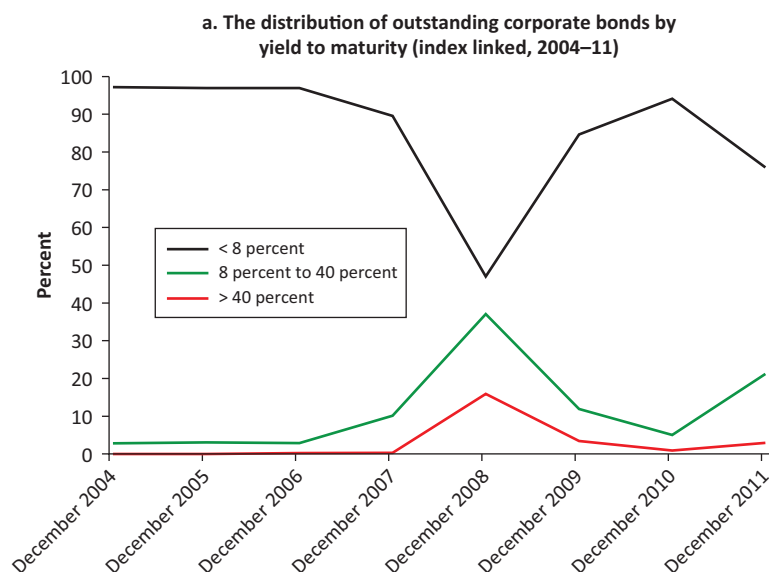
Financial stability issues were never a decisive factor in interest rate decisions in Israel, but they were raised as concerns. Israel has seen very rapid growth in the corporate bond market, from a very low level to the highest share of total credit in the developed world (Figure 2.8 panel f). Since the beginning of 2009 there has been a rapid increase in the level of distressed debt (Figure 2.9 panel a) and the number of reschedulings and debt workouts (Figure 2.9 panel b).

Concerns are high as the result of some rather unusual features of corporate structures in Israel, specifically a high level of ownership concentration, and the prominent role of “pyramid companies”—extremely highly leveraged holding companies. The possibility has been raised that low interest rates allowed the buildup of very high levels of leverage, which resulted in increased risks to the economy and financial sector. Therefore, it could be argued that prolonged excessively low interest rates in Israel should be avoided not only because they might threaten price stability, but also because they might endanger financial stability—a case of monetary policy supporting financial stability through its macroprudential impact.

Summary

Numerous difficulties arise in assessing the impact of the macroprudential steps Israel has taken so far. The steps were only recently enacted, and in some cases the counterfactual cannot be ignored. The problem of isolating the effect of individual measures is especially troubling because measures

Figure 2.9. Israel: Credit and Corporate Bonds



Source: Bank of Israel.

¹ There were no reschedulings before 2008.

² Through February 2012.

were frequently bundled together. It is also impossible to separate the effect of other external events occurring at the same time. The clearest example is in trying to assess the impact of measures taken to dampen capital inflows: in the same period, regional turbulence in the Middle East, the European debt crisis, geopolitical concerns, and gyrating global risk appetites were influencing the exchange rate as well.

Nevertheless, the interim conclusion is clear: Israel's experience with macroprudential policy has proven beneficial. Measures taken regarding mortgages appear to have reduced systemic risks to the banking system and to

important sectors of the economy, and at the same time were supportive of monetary policy. Innovative reserve requirements on derivative transactions along with heightened reporting requirements and rationalized tax policies helped dampen volatile capital flows and their potentially deleterious impact on financial stability, market function, and macroeconomic variables. Awareness of the mutual interactions between macroprudential policy and monetary policy can only improve the design and implementation of each, with beneficial results for both.

Another observation is that the impact of macroprudential measures frequently stems from their signaling effect—they are strong indicators of the availability of a wide range of tools that the central bank can use, and equally important, of the central bank’s willingness to use them to reach its goals. Credibility is strengthened.

Conclusion

There was a commonly held view during the “great moderation” of the 1980s that there could be a neat separation between the monetary and the financial stability functions of the central bank. “Monetary policy would take care of price stability while regulation and supervision would take care of financial stability” (Borio, 2011a, pp. 2–3). This is no longer believed to be the case.

Macroprudential policy should be viewed in a broad context, tying together the two key goals of a central bank: price stability and financial stability. Macroprudential policy can and should support monetary policy; in certain circumstances monetary policy can and should support financial stability, and at the very least not endanger it.

In difficult environments central banks need to achieve multiple aims, and to do this they need multiple tools. Macroprudential measures can provide those tools. The use of unconventional measures along with traditional tools can enhance the effectiveness of overall policy and increase credibility. The international context is vital to learn from other experiences, to maintain cooperation, and to observe best practice. The appropriate mix of steps can also lessen unwanted side effects and increase the flexibility of central bank policies.

A central bank should not only have the ability to implement macroprudential policy; it should also be independent in decision making and implementation. The argument is similar to that of monetary independence: time inconsistency. Research has shown that the duration of financial cycles is longer than that of real economic cycles, ranging from 6 up to 18 quarters, whereas business cycles typically last four to five quarters. Only the central bank will usually have the independence and time horizon needed to deal adequately with the challenges posed by financial cycles.

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Implementing Macroprudential Policies

Measuring and Monitoring Systemic Risk

RODOLFO MAINO

Systemic risk has taken center stage in discussions about financial stability in the aftermath of the global financial and economic crisis of 2008–09. Until the crisis, risk monitoring and controls were mainly built around the safety and soundness of individual financial firms.

Crisis prevention proved to be inadequate as the risks kept mounting, particularly risks from advanced economies that had not been timely identified and unanticipated shock transmission channels and contagion across sectors. In addition, the connections between financial, fiscal, and macroeconomic stability were not well understood. And when warnings were made, they did not successfully trigger the needed policy reaction. The increased interconnectedness among banks, brokers, insurance companies, and hedge funds posed challenges to the way systemic risks were monitored because those interconnections amplify distress and other shocks in complex financial settings.

Contagion is the very essence of any definition of systemic risk because risk is largely driven by fluctuations in economic and financial cycles over time, including the degree of interconnectedness of financial institutions and markets, common exposures, and shadow banking conditions. Cyclical risks vary over time with financial and economic conditions reflected in asset valuations; market functioning; leverage of financial institutions, households, businesses, and governments; maturity transformation and risk information; innovation (new product and services); and the constant hazard of tail risks. Hence, any measure of systemic risk should be comprehensive enough to capture all linkages, associations, potential correlated defaults, and vulnerabilities beyond the banking system.

Data Dissemination and Collection

Data gaps become a critical obstacle for the timely and accurate assessment of key systemic risk components, including interlinkages and common exposures. Accurate measurement and efficient monitoring require reliable data. Pitfalls in the collection of data related to systemic risk are well known. Moreover, systemically important financial institutions (comprising not just large financial institutions but also those that are highly interconnected) and the exact boundaries of shadow banking systems (with a proliferation of institutions and markets outside regulatory boundaries) add to the present conundrum. Given that there is no available information on linkages and leverage of financial institutions—most especially information available in a manner sufficiently timely for risk assessment—the need to go beyond the mere collection of data points is evident. The implications of systemic risk are forward looking by nature; therefore, advances need to be made in econometric and statistical modeling to try to measure those implications.

Gathering and collecting data for identifying systemic risks involves micro-level and aggregate data. Data must be captured from the widest possible set of intermediaries to enable analysis of the balance sheets of interconnected and complex financial institutions. The implementation of macroprudential instruments and policies requires deep knowledge of all financial markets, including wholesale and insurance markets and savings and loan institutions prone to contagion. The measurement of interconnectedness is becoming an art, calling for a wide array of information and data to help identify systemic risks. In this context, the Bank for International Settlements is advancing work by expanding their consolidated and locational banking statistics. Also, the IMF Statistical Department is actively collaborating with the G-20 Data Gaps Initiative, which aims at closing information gaps highlighted by the crisis.

The sharing of data with external researchers is as important as is its timely collection. Hansen (2012, p. 12) emphasized that sharing data allows for replication of results and is necessary to “nurture innovative modeling and measurement.”

Ensuring Systemic Stability: Crisis Prevention

The global financial crisis has catalyzed critical changes in the international community’s efforts at crisis prevention and response. All crisis-hit areas have accelerated their efforts to cope with extreme pressures on financial systems and strengthen the international financial architecture on issues such as cross-border resolution, regulation and supervision of the shadow banking sector, lack of data and data-sharing arrangements, too-big-to-fail institutions, and over-the-counter derivatives.

The IMF has actively improved its role in crisis prevention and response. In particular, the IMF's universal membership and legal surveillance mandate provide the institution with a unique responsibility to identify systemic risks and encourage remedial actions. In recent years, the IMF has become even more candid regarding surveillance and risk assessments, and new products have been developed to extend its existing country-specific and multilateral instruments, for example, spillover reports for the five largest economies. The IMF has also been actively engaged in strengthening macroprudential policy and discussing the feasibility of capital controls.

The Financial Stability Board (FSB) has taken decisive action to organize the multilateral effort to reform and strengthen regulatory and supervisory policies. In particular, the FSB has advanced a comprehensive framework to address the risks posed by systemically important financial institutions, including a capital surcharge and principles for the effective resolution of failing institutions. The FSB has also been working on issues related to the oversight and regulation of shadow banking systems.

Addressing Systemic Risks: Macroprudential Policies

A macroprudential policy approach allows countries to lessen risks to their financial system. Such an approach better accounts for other public policies with potential impacts on systemic financial stability. Macroprudential policy goes beyond limiting risks to individual financial institutions by aiming at containing systemic risk, including feedback between the financial sector, the real economy, and other policies. Swings in liquidity, credit, and asset-price cycles are well-known sources of systemic risk. However, the effects of those financial institutions and markets that are highly interconnected within, and across, national borders, must also be included.

Asia's experience provides useful lessons on the application of macroprudential approaches, given the proactive use of macroprudential measures by many countries in the region. Asia's effective use of macroprudential frameworks was built on certain notable elements:

- *Institutional arrangements* should ensure a policymaker's ability and willingness to act. This requires clear mandates, control over macroprudential policy instruments, safeguards for operational independence, transparency and other provisions to ensure accountability, and clear communication of decisions and decision-making processes. Recent IMF analysis suggests the following principles (IMF, 2011a):
 - o Central banks should play an important role in macroprudential policymaking given that they have expertise in risk assessment and incentives to address systemic risk in a timely and effective manner.

- o The treasury should participate, but in a way that does not delay action in good times or that undermines the independence of monetary and prudential policies.
- o Effective coordination across policies and among agencies is crucial to reducing gaps and overlaps, but their independence must also be ensured.
- *Mechanisms for systemic risk monitoring and identification* are needed that enable timely preventive action. This requires access to, and continuous monitoring of, data on business and financial cycles; on credit quantity and quality; on systemically important institutions, markets, and instruments; and on firms and activities that might be outside the perimeter of regulation. Systemic risk indicators are a useful tool, but the multidimensional nature of systemic risk means that a range of measures and qualitative information and judgment will also be necessary.
- *The policy toolkit*, containing mostly prudential instruments, needs to be available to the macroprudential policymaker. IMF (2011b) illustrates the effectiveness of frequently used prudential tools and also concludes the following:
 - o Emerging market economies have used macroprudential instruments more extensively than advanced economies have, both before and after the 2008–09 global financial crisis, but the crisis has prompted an increasing number of countries to use the instruments, and with greater frequency.
 - o The effectiveness of the instruments does not appear to depend on the exchange rate regime or the size of the financial sector, but the type of shock seems to be a crucial factor, and different types of risk call for the use of different instruments. Whatever instruments are chosen, they need to be applied in a timely manner.
 - o To be effective, macroprudential policy needs to be complemented with strong regulation and supervision of individual financial institutions and policies to resolve failed institutions.

Many challenges remain in implementing effective macroprudential policy. Systemic risk is multidimensional and difficult to identify and measure, so effective macroprudential policymaking depends on filling information gaps and on effective coordination between macroprudential policy and other public policies. This coordination can be difficult in practice and needs to be coupled with mechanisms to prevent macroprudential policy from being used as an inappropriate substitute for other public policies, especially monetary

policy. Because there will always be resistance to policy tightening before risks have been manifested, independence, accountability, and effective communication are also essential. In addition, the growing importance of cross-border systemic risks and regulatory arbitrage underscores the critical importance of effective international coordination.

Measuring Systemic Risk: The Toolkit

Based on supervisory research and data perspectives, Biais and others (2012) gathered a thorough and complete survey of systemic risk analytics, providing 31 quantitative measures spanning key themes and issues in systemic risk measurement and management.¹

There is no unique set of tools for all countries. The predictive ability of tools needs to be judged in context, because no tool is universally the best in all circumstances. Policymakers should look at all pressure points by adopting a wide range of tools to be used at any time. The objective is also to identify which tools (or combinations of tools) are among the best at measuring a specific dimension of systemic risk. Therefore, users are encouraged to calibrate their instruments to country-specific circumstances, and where appropriate, rules-of-thumb or thresholds based on cross-country analyses and research are provided. In sum, macrofinancial linkages and systemic risk are difficult to measure given the complexity and unpredictability of current financial scenarios and the scope for nonlinearities through illiquid markets or institutions and unstable correlation structures and behavioral relationships.

Billio and others (2010) grouped the literature on empirical systemic risk as follows: (1) bank contagion—based on the autocorrelation of banks' defaults, returns, and fund withdrawals, and exposures among them;² (2) macroeconomic fundamentals—focusing on bank capital ratios and liabilities, and on credit derivatives;³ and (3) joint crashes in financial markets—focusing on spillover effects on simple correlation, CoVaR (comovement of value at risk) measures, autoregressive conditional heteroskedasticity modeling, extreme dependence of securities market returns, and securities market comovements not explained by fundamentals.⁴ When data are available, tail dependence analysis becomes particularly useful. The analysis of codependence in the tails of equity returns

¹ An earlier survey of monitoring tools is presented in IMF (2011a); IMF (2011b) evaluates a small set of measures.

² For more information see Lehar (2005); Jorion (2006); Aikman and others (2009); and Huang, Zhou, and Zhu (2009).

³ The literature in this group includes works by Gonzalez-Hermosillo, Pazarbasioglu, and Billings (1996); Gonzalez-Hermosillo (1999); Bhansali, Gingrich, and Longstaff (2008); and De Nicolo and Lucchetta (2009).

⁴ See also Longin and Solnik (2001); Bae, Karolyi, and Stulz (2003); Adrian and Brunnermeier (2009); Boyson, Stahel, and Stulz (2010); Duggey (2009); and Gray and Jobst (2010).

to financial institutions is needed to distinguish the impact of the disturbances to the entire financial sector from firm-specific disturbances.⁵ Acharya and others (2010) propose using tail-risk measures for assessing the solvency of the financial system based on a direct welfare calculation that produces a marginal expected shortfall.

Based on Billio and others' (2010) classification, it was possible to devise five measures of systemic risk focusing on contagion and interconnectedness among hedge funds, brokers, banks, and insurers, including reverse contagion by adding estimation of causal relationships between financial institutions. These measures—which are aimed at capturing aspects of changes in liquidity, expected returns, and correlation—build on illiquidity, risk concentration, sensitivity (response) to market prices and economic conditions, and correlation among the holdings of financial institutions. See Box 3.1.

Building on the use of option pricing theory for firm financing—where there is an underlying stochastic process for the value of the firm assets—the contingent claims analysis of Gray and Jobst (2011) features risk adjustments to sectoral balance sheets with separate roles for debt and equity (equity is a call option on these assets and debt is a put option). Network models of the financial system are a different approach that complements these views by focusing on interconnectedness. Also, dynamic stochastic equilibrium models (Christiano, Eichenbaum, and Evans, 2005; Smets and Wouters, 2007) are built to deal with multiple shocks, explicitly modeling the time evolution of the mechanisms for those shocks. Still, much is needed to consolidate the integration of financial market constraints into these models.

Box 3.1. The Search for Systemic Risk Measures

Billio and others (2010) warned that any plausible indicator of systemic risk should capture issues related to the “four L’s” of systemic risk—liquidity, leverage, linkages, and losses. Some of the most used measures are the following:

Illiquidity and correlation. It is accepted that the more illiquid a portfolio, the larger the price impact of a forced liquidation, and the bigger the cascade effect on the rest of the economy when many investors are exposed to this shock at the same time (high correlation). The liquidity risk exposure of a given financial institution is given by the autocorrelation coefficient (ρ_k) of the institution's monthly returns,

$$\rho_k = \frac{Cov[R_t, R_{t-k}]}{Var[R_t]}$$
, where k is the order of autocorrelation of $\{R_t\}$ measuring the degree of correlation between month t 's return and month $t - k$'s return.

⁵ Adrian and Brunnermeier (2009) and Brownlees and Engle (2011) pioneered this work.

Box 3.1. (Concluded)

Principal components analysis (PCA). PCA allows the decomposition of a covariance matrix of returns for banks, brokers, insurers, and hedge funds to help detect commonalities among them. If asset returns are driven by a linear K -factor model, the first K principal components should explain most of the time-series variation in returns, $R_{jt} + \alpha_j + \delta_1 F_{1t} + \dots + \delta_K F_{Kt} + \varepsilon_{jt}$; where $E[\varepsilon_{jt} \varepsilon_{j't}] = 0$ for any $j \neq j'$ and hence the covariance matrix Σ of the vector of returns $R_t = [R_{1t} \dots R_{jt}]'$ is expressed as,

$$Var[R_t] = \Sigma = Q\Theta Q' \quad , \quad \Theta = \begin{pmatrix} \theta_1 & \dots & 0 \\ \vdots & \ddots & \vdots \\ 0 & \dots & \theta_N \end{pmatrix}$$

where Θ contains the eigenvalues of the positive definite covariance matrix Σ along its diagonal and Q is the matrix of corresponding eigenvalues. When normalized to sum to 1, each eigenvalue can be interpreted as the fraction of the total variance of turnover attributable to the corresponding principal component.

Regime-switching models. Sudden regime shifts in expected returns and volatilities can be captured by a simple Markov regime-switching model that compares the transition from a normal to a distressed scenario with returns $R_{i,t}$ satisfying the following stochastic process: $R_{i,t} = \mu_i(Z_{i,t}) + \sigma_i(Z_{i,t}) \mu_{i,t}$; where $R_{i,t}$ is the excess return of index i in period t , σ_i is the volatility of index i , $\mu_{i,t}$ is independently and identically distributed over time, and $Z_{i,t}$ is a two-state Markov chain with transition probability matrix P_{z_i} for index i . Hence, the joint probability of high-volatility regimes is given by the product of the univariate estimates,

$$J_{p,t} = \prod_{i=1}^n Prob(Z_{i,t} = IR_{i,t}).$$

Thus, the higher the joint probability of a high-volatility regime, the greater the interdependence among the sectors.

Granger causality tests. Beyond the degree of interconnectedness, the direction of the dynamic of propagation of systemic risks becomes critical. As Billio and others (2010) noted, in an informationally efficient market, price changes should not be related to other lagged variables; hence, a Granger causality test should not detect any causality. Nevertheless, the presence of market frictions—transaction costs, borrowing constraints, costs of managing information, institutional restrictions on short sales—permits the presence of spillovers among market participants.

CoVaR (comovement of value at risk) This measure uses market data to assess the contribution of an individual financial institution to systemic risk. Specifically, time-varying CoVaRs are derived by using quantile regressions—the contribution of a firm to systemic risk is the difference between the value at risk (VaR) of the financial system conditional on the distress of a particular financial institution i and the VaR of the financial system conditional on the median state of the institution i .

The Republic of Korea: Implementing Macroprudential Policies

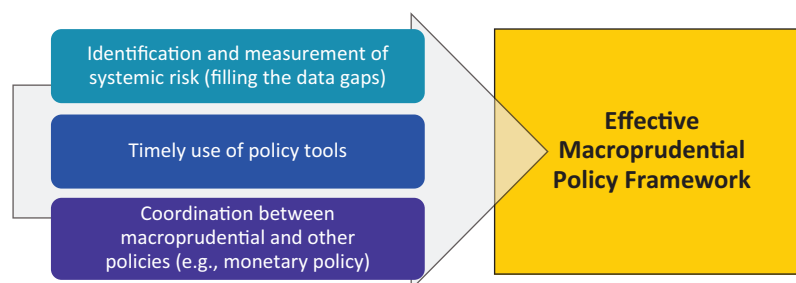
JUN IL KIM

The 2008–09 global economic and financial crisis has proved that ensuring the stability of individual financial institutions may not be enough to keep systemic risk under control. Systemic risk goes beyond the simple sum of the risks of individual institutions and involves considerations of dimensions deeper than the aggregate size of risk. For instance, how risks are distributed among financial institutions, and who holds them, matters a lot for systemic risk. Moreover, the real sector–financial sector linkages and cross-border linkages suggest that measurements of systemic risk should be able to capture the notion of interconnectedness and the complex interplay among market participants. The macroprudential policy framework (MPF) is widely discussed as an overarching framework to address the stability of the financial system as a whole. One of its key issues would be how to deal with correlated risks and risk mismatches at various levels.

The objective of MPF is to limit systemic risk in the financial system. The tools that can be employed to this end are prudential tools that are designed to target sources of systemic risk. Functionally, it may be useful to think of an effective macroprudential policy framework as consisting of three main elements: identification and measurement of systemic risk, timely use of policy tools, and effective coordination between macroprudential and other policies—for example, monetary policy (Figure 3.1). Some of these aspects will be discussed in this section.

Recently, important steps have been taken in the development of macroprudential policy instruments and in constructing the governance structure for MPF (FSB, IMF, and BIS, 2011). Progress has also been made in designing new macroprudential tools to deal with procyclicality and interconnectedness. Basel III has been introduced to reinforce Basel II (by way of introducing core capital, the liquidity coverage ratio, the net stable

Figure 3.1. Key Elements of a Macroprudential Policy Framework



Source: Nier and others, 2011.

funding ratio, and so forth) and also to put a macroprudential overlay on the current framework by adopting measures to reduce systemic risks stemming from procyclicality and interconnectedness. The Financial Stability Board (FSB) has also come to an agreement on the framework to tackle risks posed by systemically important banks (SIBs).

Identification and Measurement of Systemic Risk

The identification of systemic risk is a vital component of an effective MPF. A key task is the development of quantitative measures of systemic risk that can be easily constructed and monitored. To be effective, those measures should capture both time and cross-sectional dimensions of systemic risk. In practice, various approaches have been used and tried, such as indicator-based monitoring, stress tests, calibrated metrics, and others. As yet, no framework has been agreed upon as best practice in identifying and monitoring systemic risk. Country-specific circumstances may need to be considered and the framework tailored accordingly. Also, in light of deepening cross-border interconnectedness, an international dimension to identifying systemic risk must be taken into account along with the accompanying need for international coordination.

Improving Data and Information

A first step toward improving the identification and monitoring of systemic risks would be to address the data and information gap. Although there are many facets to this critical issue, the governance structure of MPF is crucial. If macroprudential responsibilities are shared by multiple authorities, ensuring that relevant data and information are made readily available to the authorities that need it is particularly important.

More generally, best efforts should be geared toward greater and timely availability of relevant data and better use of acquired data for policy formulation. Regarding the first data issue, various efforts have been made, such as at the FSB Working Group on Data Gaps, but there is still a long road ahead. A useful option for improving data availability could be the establishment of an agency dedicated to data collection. For example, the Office of Financial Research, established by the Dodd-Frank Act in the United States, is dedicated to collecting and making available to regulators and to the public more and better financial data. The establishment of a similar group could be a worthwhile goal for countries where a data gap is a major constraint to building an effective MPF. The second issue is just as critical—the best food is useless without a good cook. Regulators may lack the capacity, incentive, or resources to use the flood of acquired data properly, and this is yet another gap that needs to be addressed.

Domestic and International Coordination: Institutional Arrangements and Governance Models

The institutional arrangement for macroprudential policy should facilitate effective control of systemic risk. This goal could be broken down into the following elements. The institutional arrangement must provide the institutions, and parties involved, with a clear objective; provide the right incentives and tools to the authorities so that they can act appropriately to achieve that objective; support accountability and transparency of decisions; and ensure effective coordination across policy areas.

To come to grips with this issue of institutional arrangement, the stylized models for MPF, suggested by IMF (2011c), has proved especially useful (Figure 3.2). The IMF classifies the macroprudential policy framework according to the degree of integration of authorities involved, roughly equating to full integration, partial integration, and separation models (as in Korea). Each model has its own pros and cons and it would ultimately come down to making the best out of the upsides and minimizing the downsides, according to the circumstances of each country. In each case, careful consideration should be given to making sure that the institutional arrangement ensures effective policy coordination across policy areas.

Domestic Coordination

The boundaries of macroprudential policy are hard to define clearly; many other policies may also matter for financial stability. Of great interest is the relationship between monetary policy and macroprudential policy.

Figure 3.2. Three Stylized Macroprudential Policy Framework Models

	Degree of Integration		
	Full Integration	Partial Integration (Twin Peaks)	Separation
Ownership of macroprudential mandate	central bank	committee (or central bank)	multiple agencies
Examples	Czech Republic, Ireland, Singapore	United Kingdom, France, United States, Belgium, Holland	Australia, Korea, Canada, Switzerland
Pros	Free information flow Strong incentives Easy policy coordination	Depends on ownership of macroprudential mandate	Assured autonomy and accountability
Cons	Lack of accountability and coordination with government	The same as above	Impeded information flow Potential gap or overlap

Source: Nier and others, 2011.

Conceptually, monetary policy and macroprudential policy are distinct. In light of the two-way causality between price and financial stability, however, monetary and macroprudential policies need to be coordinated so as to be complementary. The recent global financial crisis was preceded by a period of great moderation in the 1980s, a fact that raises the concern that monetary policy could become a victim of its own success. Although speculative, the global crisis might have been avoided if effective macroprudential oversight had been in place. Given that not all cases of asset-price appreciation are necessarily bubbles—for example, asset-price increases driven by productivity growth—an unduly simplistic and indiscriminate application of macroprudential policy could hamper the legitimate and productive allocation of credit and investment activities.

Ideally, macroprudential policy should be used as a complementary backstop to monetary and other macroeconomic policies. Inappropriate use of macroprudential policy as a substitute for monetary policy could do more harm than good. After all, chasing after financial stability through macroprudential policy while monetary policy keeps the interest rate too low may not only be futile but could potentially plant the seed for future financial instability. Broad-based credit booms and general asset-price appreciation would call for monetary policy responses. However, asset-price bubbles in an isolated market would likely be better addressed by macroprudential policy rather than monetary policy.

Meanwhile, attention must also be paid to the potential tension between macroprudential policy and the objectives of microprudential authorities (Figure 3.3). During the boom phase of the credit cycle, the macroprudential authority may be concerned with the potential buildup of systemic risk and would consider deployment of a countercyclical policy, such as strengthening capital requirements. Meanwhile, the microprudential authority, with no mandate for systemic risk, would not be worried about credit expansion, and may be reluctant to weaken financial institutions’ profitability by limiting risk origination. Conversely, during the downturn of the credit cycle, the

Figure 3.3. Potential Tension between Macro-and Microprudential Authorities

	Boom	Downturn
Macro authority	Credit expansion ⇒ Systemic risk ⇒ Buffer accumulated	Credit contraction ⇒ Systemic risk ⇒ Buffer released
Micro authority	- No worry (no mandate for systemic risk) - Concern about lowering of financial institution profitability by limiting of asset allocation	- Unease (because capital is lower when most needed) - Concern about negative signaling effect

Source: Bank of Korea, Macroprudential Analysis Department.

macroprudential authority may loosen the capital buffer requirements to reduce the likelihood of system-wide deleveraging. But the microprudential authority is likely to be concerned with depletion of capital (because capital is less abundant when most needed) and may opt instead to strengthen the buffer requirement in response.

International Cooperation

Macroprudential policy also involves an international dimension, particularly as related to cross-border capital flows. The trend toward global integration of capital markets and the subsequent possibility of cross-border spillovers and regulatory arbitrage has made this issue particularly important. Of course, the first best response would be to seek out a global solution, but lack of global jurisdiction makes this issue difficult. Similar difficulties may have resulted in international capital flows being underregulated, and left to exert excessive negative financial externalities as manifested in the form of boom-bust cycles. Although, in theory, flexible exchange rate adjustments should be able to largely resolve the problem to a large extent, in reality, such mechanisms are often limited in scope, especially in the context of emerging market economies where exchange rate appreciation is often a significant source of economic difficulties and worsening external balances. The lack of global jurisdiction also makes it difficult to deal directly and fundamentally with the source of risk, which would be a better and fairer solution to the externality problem.

International cooperation could fill in, at least in part, the gap left by the lack of global jurisdiction. However, the incentive for cooperation could be weak at the national level. This lack of enthusiasm is owing not only to myopia, but also to the one-way nature of financial cross-border externalities (running from North to South). Thus, a key prerequisite to international cooperation on macroprudential policy would be an institutional mechanism to promote a common understanding of threats to global financial stability; that is, it is in the interest of advanced economies as well to participate in a concerted endeavor to mitigate cross-border financial risk. In addition, international cooperation on macroprudential policy would also require steps to ensure that the MPFs of individual countries are mutually consistent. Such steps would help lessen regulatory arbitrage and would also obviate a situation wherein the policies implemented by individual countries work against each other.

Finally, the scope of international financial cooperation must also be broadened, particularly between advanced market economies and emerging markets. A good example of such cooperation would be information sharing between advanced and emerging market central banks. In this regard, the consultation with nonmembers of the FSB by the Regional Consultative Group for Asia of the FSB should be commended. Such outreach efforts

would certainly reinforce international cooperation in macroprudential policy by facilitating communication and mutual understanding. Central bank currency swap lines, which proved useful in calming financial markets in emerging market economies during the 2008–09 global crisis, would also be a great avenue for further cooperation and contributions from advanced economies. In a similar vein, strengthening global or regional financial safety nets, such as provided by the IMF and the Chiang Mai Initiative, would be conducive to laying the groundwork for international cooperation.

Future Research

The remainder of this section puts forth policy questions that should be of interest for future research.

- First, what could be done to minimize, if not prevent, the unintended consequences of strengthening macroprudential oversight? The recent experience in the euro area is suggestive of the risk of unintended consequences of macroprudential policy. Specifically, anecdotal evidence indicates that strengthened capital requirements intended to ring fence European banks from contagion have forced many European banks to deleverage in the midst of financial distress. Another concern would be that strengthened MPF could stifle the economy by discouraging appropriate risk-taking for growth or even undermine the legitimate intermediation function of the financial sector. Stronger rules for liquidity coverage and capital buffers will certainly contribute to financial stability but may also weaken the growth potential of the financial industry and the broader economy as well.
- Second, what would be the implications of a stronger MPF on funding costs faced by nonfinancial borrowers—particularly those in emerging market economies? Because international claims typically carry high risk weights in the calculation of capital requirements for banks, under strengthened macroprudential regulations, global banks in advanced economies are likely to have less incentive to maintain exposure to emerging markets than otherwise. This could lead to reduced funding opportunities or higher funding costs for emerging markets.
- Third, what would be the long-run response of financial institutions to strengthened MPFs? This question also has an important bearing on how to address the previous two policy questions. The efficacy and effectiveness of an MPF would depend on the endogenous response of financial institutions. If banks and the entire financial system become safer under the new macroprudential regulations, economic theory suggests that they should perhaps be ready to live with low returns. But

it would not be unreasonable to predict that banks would change their business models to circumvent macroprudential regulations if profitability falls too low. Policymakers would face a difficult choice between financial safety and profitability, both of which matter for financial stability.

- Fourth, would stronger MPFs offer better opportunities and incentives for emerging markets to engage in financial integration to a greater depth? If international capital markets become safer with reduced volatility in capital flows, emerging market economies may opt for more capital account liberalization and further integration into global financial markets. Thus, stronger MFPs could result in safer international capital markets, making it easier for emerging markets to reap the benefit of financial liberalization and integration, bearing minimum risk.
- Fifth, how should the line be drawn between capital controls and macroprudential policy? A key difference between capital controls and macroprudential policy is whether the policy discriminates by residency. However, despite such conceptual differences, de facto effects may be similar, making such a distinction less effective in practice. For example, if macroprudential policy constraints fall disproportionately on foreigners—perhaps by being more binding on foreign banks than on domestic banks—the line between capital controls and macroprudential policy can become blurry.
- Last, how would macroprudential policy affect central bank independence? There have been claims that central banks' expanded responsibility for financial stability may undermine central bank independence in conducting monetary policy by subjecting them to political (or market) pressures. To what degree is this true, and how would central bank independence considerations affect domestic macroprudential policy coordination?

India's Experience with Macroprudential Policies

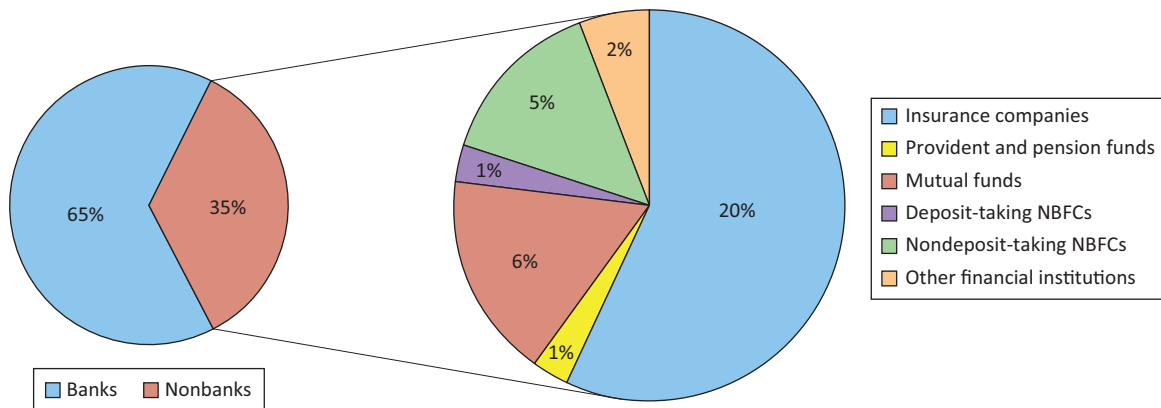
RABI N. MISHRA

The Indian Financial System and the Role of the Reserve Bank

The Indian financial system is dominated by the banking system, in particular by commercial banks (Figure 3.4). Public sector banks, in turn, comprise the largest segment of the banking system in the country, accounting for 65 percent of total banking system assets.

The country has a well-defined regulatory architecture that extends its perimeter around the entire financial system, banking as well as nonbank

Figure 3.4. Segments of the Indian Financial System



Source: Reserve Bank of India Financial Stability Report, December 2011.

Note: NBFC = nonbanking financial company.

financial institutions. The Reserve Bank of India regulates the banking sector and nonbanking financial companies (NBFCs), as well as the money, foreign exchange, and government securities markets. Sectoral regulators oversee capital markets (the Securities and Exchange Board of India), the insurance sector (the Insurance Regulatory and Development Authority), and for pension funds (the Pension Funds Regulatory and Development Authority).

Cooperation between regulators is ensured through a Financial Stability and Development Council, headed by the finance minister, which deals with issues relating to financial stability, financial sector development, interregulatory coordination, macroprudential supervision of the economy, financial inclusion, and financial literacy, among others. A subcommittee of the council, headed by the governor of the reserve bank, has emerged as the primary steering arm of the council, since its establishment in 2010.

The reserve bank is not explicitly mandated to pursue financial stability by its statute. It does, however, enjoy a mandate that is larger than is typical of many central banks. The reserve bank is the issuer of currency and is the monetary authority. It is the banker and debt manager for the government and the gatekeeper of the external sector. It regulates and supervises the payment and settlement system. Together, these roles have implicitly entrusted the reserve bank with the principal responsibility for financial stability—a responsibility the bank has taken on, given that financial stability has been one of its three principal policy objectives, along with price stability and growth, since 2004.

The Evolution of Macroprudential Policymaking in India

Because the banking sector dominates the Indian financial system, the reserve bank's macroprudential policy measures have been aimed primarily at

addressing risks in the banking system. Some measures aimed at addressing the cross-sectoral dimensions of systemic risks, especially measures to address the risks arising from interconnectedness, also encompass the nonbank financial sector. The application of countercyclical policies to the shadow banking system poses challenges, as has also been the experience internationally. The policies have aimed at increasing the resilience of the banking system.

Countercyclical Measures

The Investment Fluctuation Reserve (IFR)

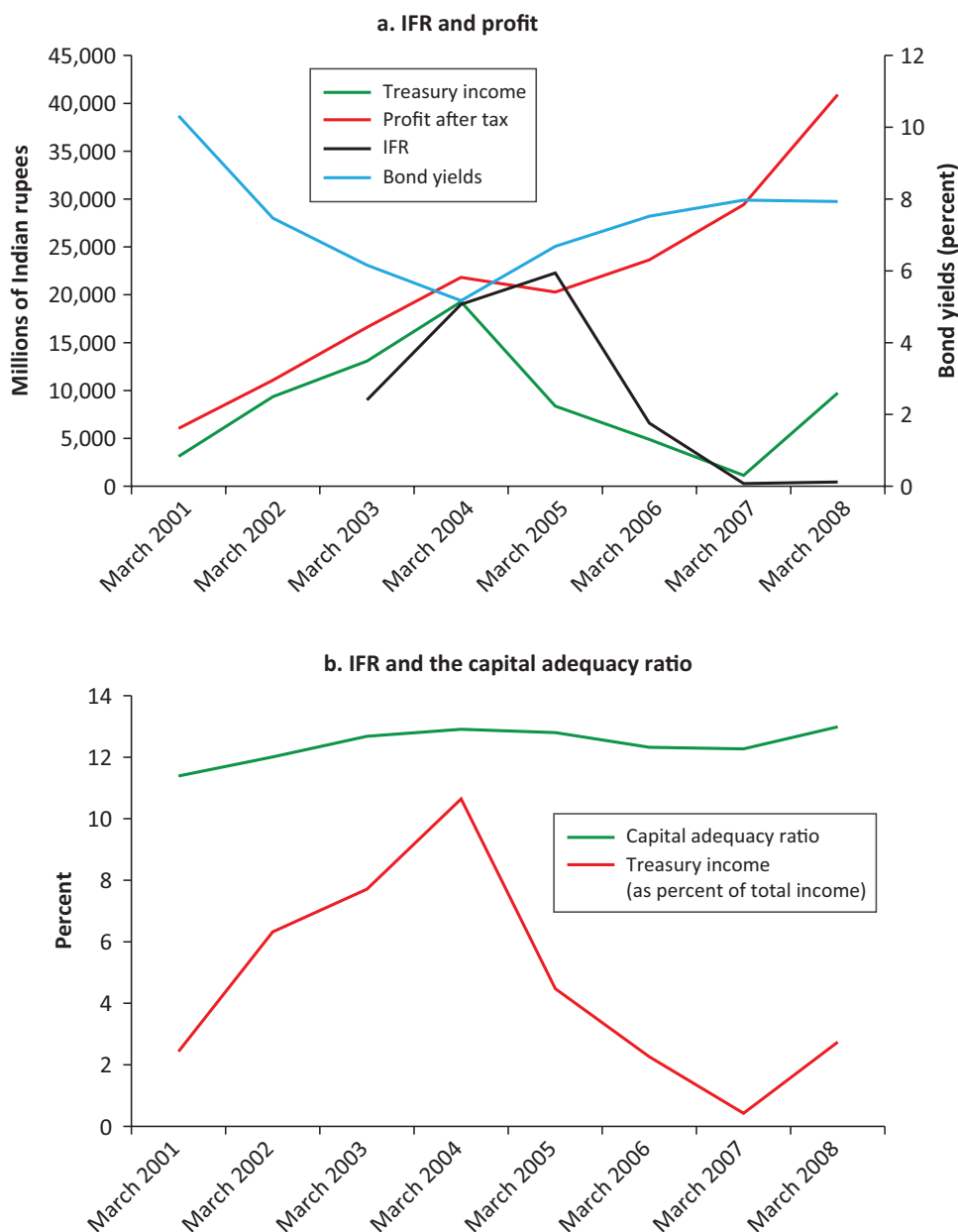
In the early years of the first decade of the 2000s, the macroeconomic and monetary policy environment was accommodative and banks in India were enjoying the benefit of marked-to-market profits. At the same time, a market risk charge on capital had yet to be prescribed for commercial banks in India. To enable banks to deal with the impact of a less benign interest rate environment when the cycle turned, an Investment Fluctuation Reserve (IFR) was introduced in 2002 as a countercyclical measure. Accordingly, banks were advised to build up an IFR to a minimum of 5.0 percent of their investment portfolios by transferring the gains realized on the sale of investments within five years. Therefore, these gains could not be distributed and the reserve thus created enabled banks to absorb losses when interest rates rose beginning in late 2004 (Figure 3.5, panel a). The measure also ensured that the capital adequacy ratios of the banking system remained stable despite the introduction of a capital charge for market risk and falling income due to an increase in yields (Figure 3.5, panel b). The prescription was withdrawn once the capital charge for market risk was applied.

Time-Varying Risk Weights and Provisioning Norms

Traditionally, banks' loans and advances portfolio is procyclical, tending to grow quickly during an expansionary phase and slowly during a recessionary phase. During times of expansion and accelerated credit growth, there is a tendency to underestimate the level of inherent risk and the converse holds true during times of recession. This tendency is not effectively addressed by the prudential specific provisioning requirements for impaired assets because they capture risk ex post but not ex ante.⁶ To reduce the element

⁶ Reserve Bank of India's mid-term review of its Annual Policy of 2005–06.

Figure 3.5. India: Effect of the Investment Fluctuation Reserve (IFR)



Source: Reserve Bank of India.

of procyclicality, calibrated risk weights and provisioning norms at different stages of the economic and credit cycles are used.

The use of time-varying risk weights and provisions in India was largely sectoral. As stated in BIS (2010, p. 10), “the most widely used macroprudential instruments have been measures to limit credit supply to specific sectors that are seen as prone to excessive credit growth.” In India,

time-varying risk weights and provisioning norms were extensively used in response to a macrofinancial backdrop that pointed to disproportionately high rates of growth of credit to specific sectors like housing, commercial real estate, and the retail segment. When the correction did set in, in the wake of the global crisis, some of these measures were relaxed to enable banks to cope with the adverse macrofinancial conditions.

The tightening and build-up phase

In the early years of the new millennium, GDP grew at about 9 percent, inflation was high, and a huge flow of foreign capital entered the country. While overall bank credit growth accelerated considerably (about 30 percent), credit growth to certain sectors, such as real estate, accelerated much more sharply (about 100 percent).

Against this backdrop, in July 2005 the risk weights on banks' exposures to commercial real estate were increased to 125 percent from 100 percent. The increase in risk weights and in the standard asset provisioning requirement in 2005 scaled back the credit growth rate in real estate to about 9 percent by March 2006. However, the credit growth rate increased again, requiring further action. In May 2006, the risk weight was further increased to 150 percent and the standard asset provisioning requirement was raised to 1 percent (Table 3.1 and Figure 3.6).

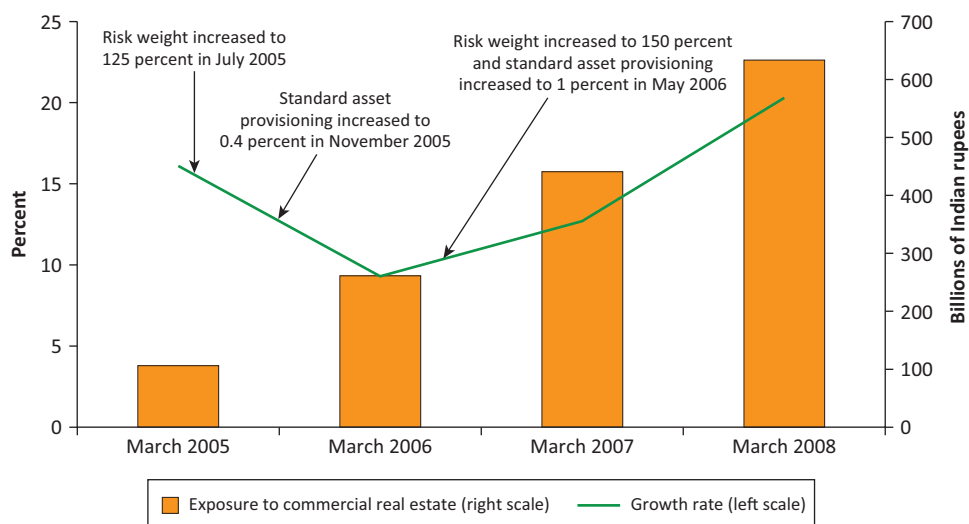
Similarly, given the evidence of sharply rising housing prices and a heightened growth rate of credit to the housing sector (about 40 percent), the risk weights on housing loans extended by banks to individuals were increased to 75 percent from 50 percent in December 2004. Subsequently, the risk weights on smaller housing loans (priority sector) were reduced to 50 percent from 75

Table 3.1. Banks' Exposure to Commercial Real Estate

Date	Risk weight (percent)	Provisioning requirement for standard assets (percent)
December 2004	100	0.25
July 2005	125	0.25
November 2005	125	0.40
May 2006	150	1.00
January 2007	150	2.00
November 2008	100	0.40

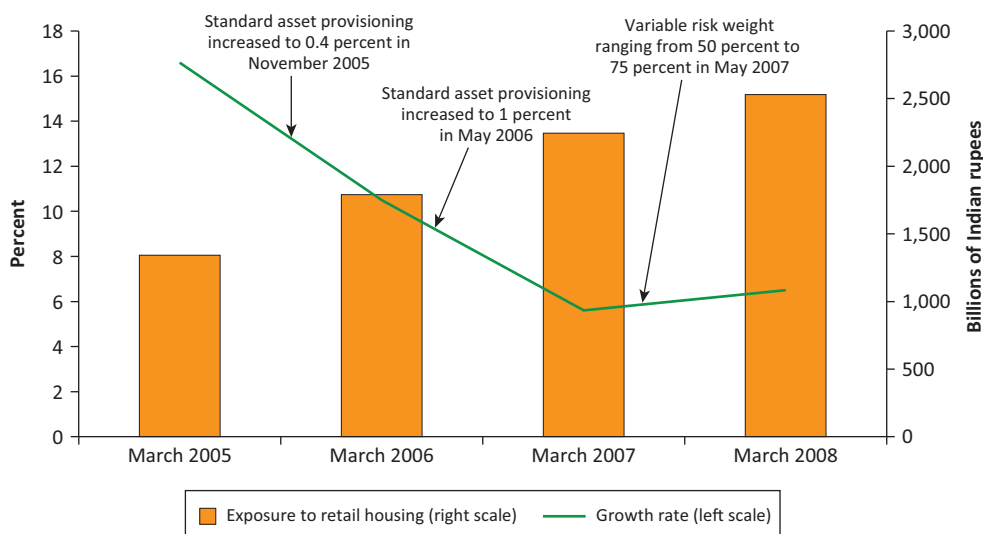
Source: Reserve Bank of India, Annual Reports.

Figure 3.6. India: Build-Up Phase—Commercial Real Estate



Source: Reserve Bank of India.

Figure 3.7. India: Build-Up Phase—Retail Housing Loans



Source: Reserve Bank of India.

percent, while the risk weights on larger loans and those with a loan-to-value ratio exceeding 75 percent were increased to 100 percent (Tables 3.2 and 3.3). These measures helped bring down the growth rate in credit to the retail housing sector from greater than 16 percent in March 2005 to about 6 percent by March 2008 (Figure 3.7).

Table 3.2. Banks' Exposure to Retail Housing Loans

Period	Risk weight (percent)	Provisioning requirement for standard assets (percent)
December 2004	75	0.25
November 2005	75	0.40
May 2006	75	1.00
May 2007	50–75	1.00
May 2008	50–100	1.00
November 2008	50–100	0.40

Source: Reserve Bank of India, Annual Reports.

Table 3.3. Differential Risk Weight for Retail Housing Loans

Loan amount	Loan-to-value ratio (percent)	Risk weight (percent)
Up to Rs 3 million	≤ 75 percent	50
	> 75 percent	100
Rs 3 million to Rs 7.5 million	≤ 75 percent	75
	> 75 percent	100
Rs 7.5 million and above		125

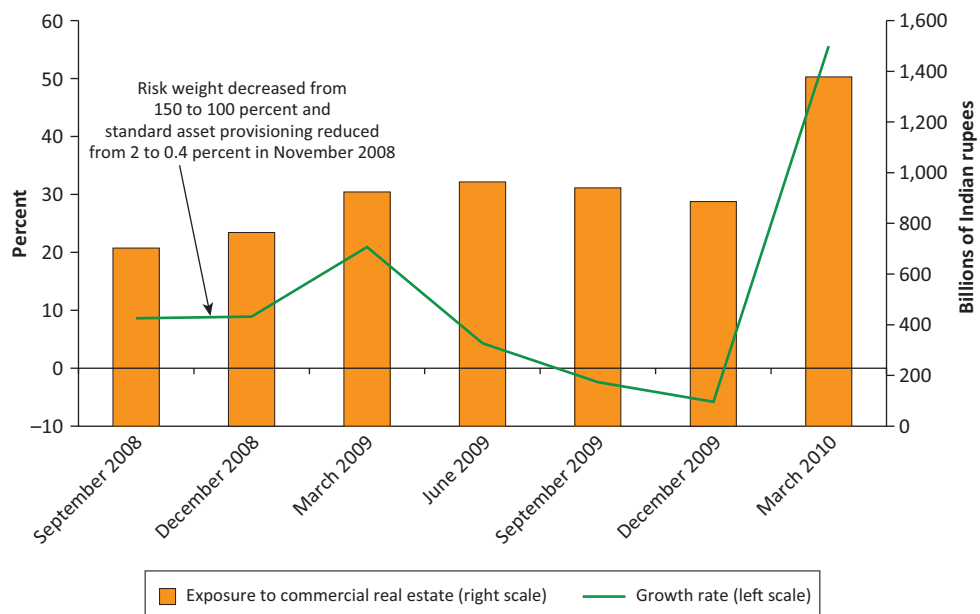
Source: Reserve Bank of India, Annual Reports.

Note: Overall cap on loan-to-value ratio of 80 percent for loans above Rs 2 million and 90 percent for loans up to Rs 2 million. Rs = Indian rupee.

Risk weights on consumer credit and capital market exposures were also increased to 125 percent from 100 percent. The provisions for standard assets were revised progressively upward in November 2005, May 2006, and January 2007, in view of the continued high credit growth in personal loans, credit card receivables, loans and advances qualifying as capital market exposures, and loans and advances to the nonbank financial sector.

The release phase

When the headwinds from the global financial crisis started having an impact on the domestic macroeconomy and the domestic financial system, the Reserve Bank of India responded by easing the risk weights and the standard asset provisioning norms for these sectors (Figure 3.8).

Figure 3.8. India: Release Phase—Commercial Real Estate


Source: Reserve Bank of India.

Back to the build-up phase

By 2009, the domestic economy could come out from the clutches of the global meltdown, and the expansionary measures adopted during the recessionary phase had to be exited. The primary concern was about the asset quality of banks, on account of the exuberant lending during the boom period followed by the reserve bank's relaxation of norms for restructuring advances during the crisis. Subsequently, banks were prescribed to achieve a provisioning coverage ratio of 70 percent of gross nonperforming advances by September 2010 as a macroprudential measure, with a view to augmenting provisioning buffers in a countercyclical manner.

Unique Dimensions of the Reserve Bank's Countercyclical Policies

The reserve bank's approach to countercyclical macroprudential policies has been based on the exercise of judgment, though empirical and anecdotal evidence were used to confirm policy judgments. The decisions were based on information such as a clear trend in significant year-to-year increases in aggregate bank credit; evidence from on-site inspections of banks; emerging signs of the underpricing of risks; a growing trend of residential mortgages for investment purposes; and a visibly steep increase in land prices evidenced by auction results. Thus, the approach to countercyclical policy was not rule bound and was based on the possibility rather than the certainty of asset-price bubbles.

One extremely important factor in the conduct of countercyclical policy by the reserve bank was the coordinated approach to implementation of monetary and macroprudential policy, as illustrated by Table 3.4. Whereas the interest rate measures were aimed at dealing with the inflation scenario, the countercyclical policies were aimed at “leaning against the wind” with a view to curbing procyclicality. The use of the policy mix was critical, because during the build-up phase in a growing economy like India’s, the use of blunt instruments such as interest rates to moderate sectoral exuberance could have inflicted significant collateral damage in the form of a reduced flow of credit to the entire economy. Such coordination was rendered possible in India as a result of the multiple roles of the reserve bank—as the monetary authority, the regulator and supervisor of the banking sector and a major portion of the nonbanking financial sector, and as the implicit macroprudential authority.

Other Macroprudential Measures

Interconnectedness between Banks

Cross-holding of capital among banks and financial institutions

- Banks’ and financial institutions’ investments in instruments issued by other banks and financial institutions that are eligible for capital status for the investee bank or financial institution should not exceed 10 percent of the investing bank’s capital funds (Tier 1 plus Tier 2).
- Banks and financial institutions should not acquire any fresh stake in a bank’s equity shares, if by such acquisition, the investing bank’s or financial institution’s holding exceeds 5 percent of the investee bank’s equity capital.
- Banks’ and financial institutions’ investments in the equity capital of subsidiaries are at present deducted from their Tier 1 capital for capital adequacy purposes. Investments in the instruments issued by banks and financial institutions that are listed, which are not deducted from Tier 1 capital of the investing bank or financial institution, will attract 100 percent risk weight for credit risk for capital adequacy purposes.

Interbank liability limits

- The interbank liability of a bank should not exceed 200 percent of its net worth as of March 31 of the previous year. However, individual banks may, with the approval of their boards of directors, fix a lower limit for their interbank liabilities, in view of their business models. Banks whose

Table 3.4. Coordinated Policy Response

Measure	Monetary tightening phase	Monetary easing phase	Monetary tightening phase
	(September 2004– August 2008)	(October 2008– April 2009)	(October 2009 to date)
Monetary Measures (basis points)			
Repo rate	300	–425	250
Reverse repo rate	125	–275	300
Cash reserve ratio	450	–400	100
Provisioning Norms (basis points)			
Capital market exposures	175	–160	0
Housing loans	75	–60	160 ¹
Retail loans other than housing loans	175	–160	0
Commercial real estate loans	175	–160	60
Non-deposit-taking systemically important nonfinancial companies	175	–160	0
Risk Weights (percent)			
Capital market exposures	25	0	0
Housing loans	–25 to 25 ²	0	0 – 25 ³
Retail loans other than housing loans	25	0	0
Commercial real estate loans	50	–50	0
Non-deposit-taking systemically important nonfinancial companies	25	–25	0

Source: “Macroprudential Policies: Indian Experience,” an address by Mr. Anand Sinha, Deputy Governor, Reserve Bank of India, at the Eleventh Annual International Seminar on Policy Challenges for the Financial Sector on “Seeing Both the Forest and the Trees—Supervising Systemic Risk,” co-hosted by the Board of Governors of the Federal Reserve System, the International Monetary Fund, and the World Bank, Washington, DC, June 1–3, 2011.

¹ Provisioning requirement for housing loans with teaser interest rates was increased to 2.0 percent in December 2010.

² Risk weight on housing loans of relatively smaller size classified as priority sector was reduced from 75 percent to 50 percent in May 2007, which was not a countercyclical measure but rather an attempt to align the risk weights on secured mortgages with the provisions of Basel II, which was to be implemented with an effective date of March 2008. For larger loans and those with loan-to-value ratios exceeding 75 percent, the risk weight was increased to 100 percent from 75 percent.

³ The risk weight on loans above 7.5 million rupees was increased to 125 percent.

capital-to-risk-weighted-assets ratio is at least 25 percent more than the minimum of such ratio (9 percent), that is, 11.25 percent, as of March 31 of the previous year, are allowed to have an interbank liability of up to 300 percent of net worth. The prescribed limit will include only fund-based interbank liabilities within India (including interbank liabilities in foreign currency to banks operating within India).

Call money market. To ensure nondisruptive functioning of the interbank markets, access to the uncollateralized funding market (the call money market) is restricted to banks and primary dealers and there are caps on both lending and borrowing:

- *Call money borrowing limit.* At present, on a fortnightly average basis, such borrowings should not exceed 100 percent of a bank's capital funds. However, banks are allowed to borrow a maximum of 125 percent of their capital funds on any day, during a fortnight.
- *Call money lending limit.* At present, on a fortnightly average basis, banks' lending in the call money market should not exceed 25 percent of their capital funds. However, banks are allowed to lend a maximum of 50 percent of their capital funds on any day, during a fortnight.

Interconnectedness between Banks and Other Entities in the Financial Sector

- *Banks exposures to NBFCs.* The exposure (both lending and investment, including off-balance sheet exposures) of a bank to a single NBFC or NBFC-AFC (asset financing company) should not exceed 10 percent or 15 percent, respectively, of the bank's capital funds on its last audited balance sheet. Banks may, however, assume exposures to a single NBFC or NBFC-AFC up to 15 percent or 20 percent, respectively, of their capital funds, provided the exposure in excess of 10 percent or 15 percent, respectively, is the result of funds on-lent by the NBFC or NBFC-AFC to the infrastructure sector. Exposure of a bank to infrastructure finance companies should not exceed 15 percent of its capital funds on its last audited balance sheet, with a provision to increase the exposure to 20 percent if it is the result of funds on-lent by the infrastructure finance company to the infrastructure sector.
- *Banks' exposures to mutual funds.* Banks' total investments in liquid or short-term debt schemes (by whatever name) of mutual funds with a weighted average maturity of portfolio of not more than one year will be subject to a prudential cap of 10 percent of their net worth as of March 31 of the previous year. The weighted average maturity would be calculated as

the average of the remaining period of maturity of securities weighted by the sums invested.

Common and Large Exposures

- *Single and group exposure ceilings.* The exposure ceiling limits are stipulated as 15 percent of capital funds for a single borrower and 40 percent of capital funds for a borrower group. The capital funds for the purpose of this ceiling will comprise of Tier 1 and Tier 2 capital as defined under capital adequacy standards.
- *Capital market exposures.* Banks' exposures to the capital market are subject to a regulatory limit of 40 percent of their net worth on a solo as well as a group basis.
- *Exposure to sensitive and other sectors.* Banks' exposures to sensitive sectors, such as real estate, systemically important NBFCs, and the commodity sector, are closely monitored. Banks are encouraged to place internal sectoral limits on other segments as well to ensure that their aggregate exposures are well dispersed.

Measures for Managing Capital Outflows by Encouraging Inflows

- Inflows for External Commercial Borrowings maturing in three to five years. The cap on costs was increased from London interbank offered rate (Libor) + 300 basis points to Libor + 350 basis points in November 2011.
- Non-Resident (External) Rupee interest rates were deregulated to attract capital flows from expatriate Indians.

Measures for Managing Excessive Capital Inflows

- Mutual funds are permitted to invest abroad up to US\$7 billion currently (increased from US\$500 million at the end of the 1990s).
- Similarly, corporates currently can invest abroad through joint ventures and wholly owned subsidiaries up to 400 percent of their net worth. This is an increase from an earlier limit of 100 percent. Reserve bank approval is required for an investment abroad greater than this limit.
- Inflows to India are subject to a hierarchy of preferences with direct investment preferred to portfolio flows, rupee-denominated debt preferred to foreign currency debt, and medium- and long-term debt preferred to short-term debt.

Conclusion

The assessment of the impact of macroprudential measures in India, as in any jurisdiction, is challenging. Where macroprudential policy and monetary policy measures are implemented in tandem, as in India, further challenges arise in isolating the impact of the macroprudential policy measures from that of the monetary policy measures. Notwithstanding these limitations, reasonable evidence indicates that the measures taken by the Reserve Bank of India to curb exuberance in select sectors met with a reasonable degree of success in moderating credit flow toward the targeted sectors, because of both the resulting higher cost of credit to these sectors and the signaling impact of the central bank measures. However, as a result of the predominant risk-averse sentiment prevailing in the banking sector in the release phase, the countercyclical measures adopted during the period were relatively less effective in arresting the slowdown in credit growth.

Macroprudential Policy in New Zealand

CHRIS HUNT

This section provides a brief overview of the framework for macrofinancial analysis at the Reserve Bank of New Zealand (RBNZ), and more particularly, the development of new macroprudential instruments. The lesson for prudential policy from the 2008–09 global financial crisis has been clear: regulatory authorities must take more account of macrofinancial risk, in addition to the traditional the microfinancial risks specific to individual banks and other financial institutions. The RBNZ's policy work in this area reflects a broader global effort to bolster the macroprudential framework.

The first part of this section outlines the New Zealand economic and institutional context for prudential policy and is followed by a short discussion of the tools that the RBNZ is currently exploring, which could be helpful in mitigating the effects of financial system risk. Focus is given to our core funding ratio (CFR), which is the New Zealand variant of the Basel Committee's net stable funding and is designed to address the funding-liquidity risks to the New Zealand banking system. The section concludes by outlining the further work that is necessary to fully implement a suite of new macroprudential instruments.

At present, there is no compelling case for using any new macroprudential tool to address the buildup in systemic risk or emerging financial vulnerabilities in New Zealand. Credit growth has been virtually zero since the start of the financial crisis, as households and firms have been deleveraging or restructuring their balance sheets, given the accumulation of debt in the

period before 2007.⁷ Nevertheless, it is important to prepare the groundwork for macroprudential policy and to pre-position the new instruments for when the next credit and asset-price boom materializes.

Economic and Institutional Context

New Zealand has a small open economy and its financial system is well integrated into the international financial system. So, not surprisingly, New Zealand was heavily affected by the global financial crisis and the global recession that followed. In the real economy, New Zealand's export prices tumbled and GDP growth remained negative or flat through most of 2008–09. The recovery in activity to date has been reasonably subdued, with real GDP yet to surpass the 2007 peak.

The New Zealand financial system is small by international standards, about 250 percent of GDP. However, the banking system is very large relative to total financial system assets, at 80 percent. The banking system is also highly concentrated, with the four largest banks—all of which are Australian owned—accounting for nearly 90 percent of total bank assets. Only 4 out of a total of 21 registered banks are New Zealand owned; these 4 together account for just 6 percent of bank assets.

New Zealand's banking system did not experience a major deterioration in asset quality, and nonperforming loans remained low by international standards. However, when global debt markets froze, the banks were unable to access offshore funding for a number of months other than for very short terms. The funding shortage was alleviated through reserve bank liquidity support, and a government guarantee on wholesale bank debt assisted banks in issuing debt when markets reopened. The nonbank lending sector (credit unions, building societies, and finance companies) experienced a string of company failures. These failures were related more to the domestic property sector downturn and weak internal governance than to international developments. However, increasing investor caution and competition for funding in the wake of the global financial crisis did increase the funding pressures on financial sector companies.

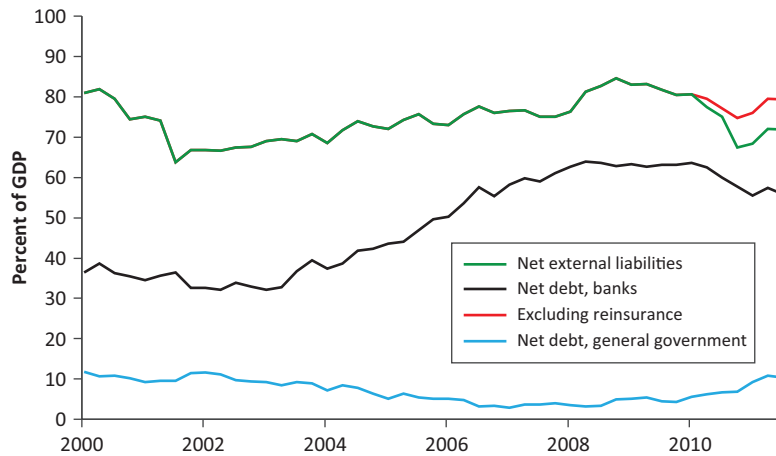
The pool of domestic savings to fund investment is limited, given the level of indebtedness of New Zealand households. As a consequence, New Zealand has run ongoing current account deficits and accumulated a large net external liability position with the rest of the world. Much of this debt is linked

⁷ However, New Zealand households remain highly indebted by international standards despite reducing the rate of debt accumulation and improving debt-to-income ratios. Moreover, the New Zealand economy also has a very high level of external indebtedness, which creates vulnerability and a dependency on developments in global financial markets.

to overseas borrowing by the New Zealand banking system (Figure 3.9), essentially to fund lending to households and firms.

During the expansion of economic activity up until 2007, lending to households, agriculture, and much of the business sector expanded significantly. Credit growth averaged 15 percent per year at its peak between 2004 and 2006 (Figure 3.10). In funding this credit, banks increasingly relied on short-term debt raised primarily from the U.S. commercial paper market. It

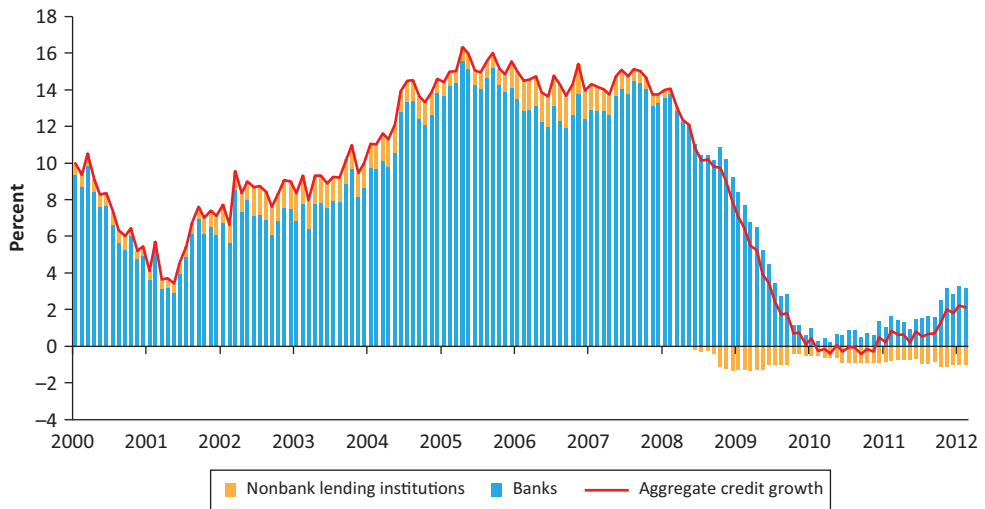
Figure 3.9. New Zealand: Net External Liabilities



Source: Statistics New Zealand.

Note: The reinsurance effect refers to the flows from global insurers as a result of the Canterbury earthquakes in late 2010 and early 2011.

Figure 3.10. New Zealand: Credit Growth by Sector (contribution to total credit growth)



Source: Reserve Bank of New Zealand Standard Statistical Return.

Note: Credit refers to private sector credit intermediated by financial institutions.

was this funding-liquidity risk (rollover risk) that provided the key concern for New Zealand policymakers during the financial crisis.

Macrofinancial Analysis at the RBNZ

The RBNZ is a “full service” central bank with legislative responsibilities covering both price and financial stability. The bank is also the prudential regulator of banks, nonbank deposit-taking institutions, and most recently, the insurance sector.⁸ No explicit macrofinancial stability objective is set out in RBNZ’s enabling legislation aside from a general requirement to promote the soundness and efficiency of the financial system. These powers do, however, enable the bank to develop or modify prudential tools with a macroprudential objective in mind. This new macroprudential framework is being developed in consultation with the treasury, and an explicit macroprudential governance framework will be agreed on with the minister of finance as a basis for policy decisions in the future.

Attention to macrofinancial stability issues was first developed within the RBNZ in response to the Asian financial crisis of the late 1990s. In 2000, a team was set up to monitor financial system risks and their relationship to the macroeconomy. In 2004, this team began publishing the semiannual *Financial Stability Report*, which summarizes the health of the New Zealand financial system and the associated risks and vulnerabilities. During the 2008–09 global financial crisis a new committee was established, the Macro-financial Committee (MFC), to focus explicitly on macrofinancial stability issues. The MFC complements the other two main decision-making bodies concerned with monetary policy and microprudential regulation, respectively. MFC is the body within the RBNZ that is currently considering the development of new macroprudential tools to address systemic risk.

However, the focus on macroprudential tools is not an entirely new development. In the past the RBNZ, in concert with the treasury, has considered a number of prudential instruments as part of an investigation into supplementary tools that could potentially help monetary policy combat inflation pressures arising mainly from the housing sector and allow less reliance to be placed on the policy interest rate. In an inflation targeting regime with a floating exchange rate, increasing the policy rate to combat inflation pressures can put upward pressure on the exchange rate by way of the carry trade and can negatively affect industries in the tradables-producing sector.

⁸ Nonbank deposit-taking institutions comprise credit unions, building societies, and deposit-taking finance companies. The wider nonbank lending sector also includes non-deposit-taking finance companies, which are not regulated by the RBNZ. At its peak, the nonbank lending sector accounted for about 8 percent of total lending and \$25 billion in assets. As of December 2011, the sector is half this size—a result of a number of finance company failures and the ongoing restructuring and consolidation in the sector (including two institutions that left the sector and registered as banks).

The RBNZ and treasury released a report in 2006 that concluded there was no easy way of solving this policy dilemma for a small open economy like New Zealand, but that several tools might help at the margin, including some instruments that are now considered macroprudential in nature (RBNZ and Treasury, 2006). However, none of the instruments identified at this time were subsequently adopted, with most appearing to entail significant costs or likely to be of limited effectiveness.

The global financial crisis has reactivated interest in the role of macroprudential tools and the work program has broadened from its earlier focus. Although still cautious about what can be achieved through macroprudential policy, it may have a role to play in addressing systemic risks in the financial system in a way that both microprudential settings and monetary policy before the crisis did not.

The reserve bank has followed the international debate with interest—a debate that has greatly increased the understanding of the two main dimensions of systemic risk: how systemic risk is distributed across the financial system at any time (the cross-sectional dimension), and how systemic risk builds up over time and helps drive the broader economic cycle (the time-varying dimension). The view at the RBNZ is that the primary objective or role of any new macroprudential tool should be to build up financial system resilience so that financial institutions are better able to weather adverse shocks. It is possible that some tools could also have a role to play in successfully reducing the amplitude of the credit cycle and broader macrostabilization, though this remains to be seen.

Expanding the Macroprudential Toolkit

The RBNZ's focus in relation to developing macroprudential tools has been on addressing the effects of financial system procyclicality and the time-varying dimension of systemic risk. Four tools have been examined in this regard:⁹

- the Basel Committee's countercyclical capital buffer;
- the RBNZ's own core funding ratio;
- loan-to-value ratio restrictions; and
- overlays to sectoral capital risk weights.

⁹ For a fuller discussion, see various RBNZ *Financial Stability Reports*; Bollard, 2011; Ha and Hodgetts, 2011; and Spencer, 2010.

To supplement the development of new tools, an early warning system that is necessary for calibrating the implementation of any tool is in the early stages of development. A robust framework is required that tells the policymaker—subject to the usual levels of uncertainty—when vulnerabilities and imbalances are emerging, and when they are reaching potentially critical levels that might warrant macroprudential intervention.

As an aside, the RBNZ is also in the process of implementing the Basel III capital regime for the banking system. Most of the new capital standards are expected to be adopted, but will be tailored to suit the New Zealand conditions. This regime is expected to be implemented well ahead of the Basel timetable. The RBNZ is also implementing a bank resolution policy designed to reduce the adverse consequences of a bank failure and the cost to the taxpayer if this event were to occur (Hoskin and Woolford, 2011). By requiring banks to pre-position their systems for the Open Bank Resolution policy, the policy might have an effect on ex ante risk taking, thereby helping to reduce overall systemic risk. One aim of the policy is to remove the perception that there is a “too-big-to-fail” subsidy or guarantee offered by the government.

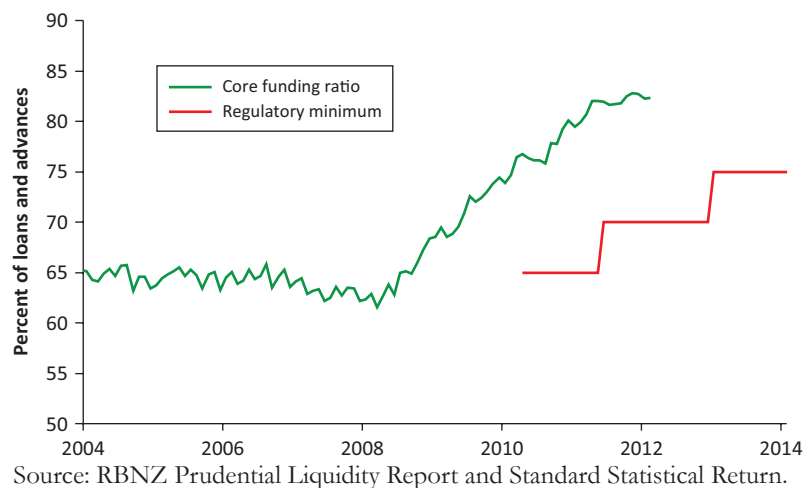
The Core Funding Ratio as a Macroprudential Instrument

The key risk to the banking system during the crisis was the unavailability of funding, given the banking system’s reliance on short-term debt raised in offshore markets to help fund balance sheet growth during the boom period. In April 2010, the RBNZ introduced a new liquidity policy to address this risk and improve the maturity profile of bank funding (Hoskin, Nield, and Richardson, 2009).

The core funding ratio, which, along with one-week and one-month liquidity mismatch ratios, forms the policy, defining a minimum level of stable funding to which banks must adhere. Stable funding is defined as retail funding and wholesale funding greater than one year to maturity as a share of total loans and advances. Tier 1 capital is also included. The core funding ratio was initially set at 65 percent and was increased in mid-2011 to 70 percent. The RBNZ plans to increase the core funding ratio further to 75 percent early in 2013. This increase was originally planned to occur in July 2012 but was deferred in response to the European sovereign debt crisis, which saw term debt markets effectively closed during much of 2011.

As a result of both the policy and banks’ own efforts (core funding started to increase before the formal implementation of the liquidity policy), the core funding of the New Zealand banking system has improved since late 2008 (Figure 3.11).

Figure 3.11. New Zealand: Core Funding Ratio



The core funding ratio is viewed primarily as a microprudential tool, albeit a tool that might also have important macroprudential properties. For example, there is reason to believe that a fixed core funding ratio (e.g., set at 75 percent) could have some stabilization effect during a credit boom. Banks would have to rely on more expensive sources of funding—retail deposits or long-term wholesale funding—to fund balance sheet growth. This result could serve to dampen credit growth by raising the banks’ costs of funds at the margin.

The RBNZ has undertaken simulations examining this cost-of-funding effect, and the size of such an impact depends crucially on what happens to credit spreads over the cycle (Ha and Hodgetts, 2011). Typically, credit spreads contract during a boom as risk aversion declines. Therefore, any automatic stabilization property may depend on how aligned the New Zealand credit cycle is with the global business cycle and the extent of any contraction in term debt spreads.

In addition to this cost of funding channel, a “sand in the wheels” effect may also be operating with a fixed core funding ratio. Banks cannot easily and quickly increase the level of core funding even in benign financial market conditions. The placement of term debt, for example, has to be planned ahead and marketed. The pool of domestic and global investors that would potentially purchase such bonds is much smaller than for short-term debt, so there may be saturation effects. Moreover, in periods of market stress as witnessed since mid-2011, the window of opportunity for New Zealand banks to issue long-term debt can be quite narrow or nonexistent.

Any automatic stabilization impact of the core funding ratio would arguably be magnified if the tool were to be adjusted over the cycle. An adjustable core funding ratio would work in much the same way as the countercyclical capital buffer proposed by the Basel Committee. It would build buffers (in this case

funding-liquidity buffers) during a boom by increasing the core funding ratio above its 75 percent minimum, and release such buffers during an economic downturn to prevent a possible credit crunch when funding conditions tighten.

In addition to the channels outlined above, important signaling or moral suasion effects may be available that could work to enhance the macroprudential properties of the core funding ratio. The announcement of any adjustment would send a powerful signal to banks, their investors, rating agencies, and the public at large about the regulatory authority's unease or concern with the rapid pace of credit growth, or financial imbalances. Market behavior may therefore be influenced by the announcement itself in a way that positively reinforces the actual increase in the core funding ratio.

As with a fixed core funding ratio, the impact on credit growth during a boom will depend on what happens to credit spreads. Overall, an adjustable core funding ratio could play a useful supplementary role in stabilizing the credit cycle, while building further resilience of the banking system to funding-liquidity shocks.

Future Steps

The RBNZ is still in the early stages of developing its macroprudential policy framework. For example, the “Macro-prudential Indicator Report,” which is used internally, will continue to be refined. This report attempts to identify emerging vulnerabilities in the financial system that might justify macroprudential interventions. This report will include ongoing examination of the sorts of trigger variables that might be helpful for indicating when to ease macroprudential settings (e.g., release the countercyclical capital buffer or reduce the core funding ratio). The analysis so far confirms that the available indicators are imperfect and cannot be used in a mechanical fashion. Thus, a checklist of indicators is being developed, and judgment must continue to be exercised.

As mentioned earlier, the RBNZ is continuing to work through the various governance issues associated with the macroprudential policy framework. Part of this work includes a consideration of the bank's legal powers in relation to extending the framework beyond banks to nonbank lenders.

Macroprudential Measures: The Bangladesh Experience

SHITANGSHU KUMAR SUR CHOWDHURY

Bangladesh has consistently pursued a cautious, prudent stance in its monetary and fiscal policies, with fiscal deficits around or below 4 percent of

GDP since the beginning of the 2000s¹⁰. The government's modest revenue base (as a percentage of GDP) is widening steadily with ongoing reforms in revenue administration, rising to 12.5 percent in fiscal year 2012(FY2012) from 10.9 percent in FY2010. The country's medium-term macroeconomic framework targets the revenue base to reach 14.5 percent of GDP by FY2015.

The Bangladesh economy was not severely affected by the 2008–09 global financial crisis and economic downturn, owing to its limited and regulated external exposure, and pro-active government policies. Crisis-related downturns in mature advanced economies caused some lagged effects, however, prompting Bangladesh to reposition itself through a framework of macroprudential measures aimed at addressing the negative impacts of the global economic slowdown. A brief description of the measures and their after effects follows.

Capital Flows

Although a member of the World Trade Organization since its inception in 1995, with an open trade regime and full current account convertibility of the Bangladesh taka (Tk.), Bangladesh maintains some capital account controls to protect its relatively small economy from destabilizing surges of footloose international capital flows. Bangladesh permits unrestricted inflows and outflows of nonresident-owned direct or portfolio investments and earnings thereon, but restricts investment abroad by residents, as well as short-term fund inflows and outflows other than normal trade credit. This policy regime kept banks and financial institutions in Bangladesh free of toxic assets and contagion from external markets in the global crisis, safeguarding their solvency and liquidity.

The crisis-related downturn in mature advanced economies brought about some lagged effects, however, in a brief spell of export and import slowdown and an attendant mild decline in GDP growth. During this spell, the government extended support to the affected export sectors and enhanced social safety net expenditure to bolster domestic demand. Regulations for undertaking forward transactions of foreign exchange have been liberalized to reduce the foreign exchange risk in international trade. Export subsidies and cash incentives have been enhanced for a wider range of industries, specifically frozen food and jute and leather products. Loan rescheduling conditions were relaxed, waiving down payment requirements (until June 2010) for recession-hit export-oriented industries, especially frozen food, leather and leather products, jute and jute goods, textiles (including spinning) and ready-made garments (RMG). Fiscal stimulus of Tk. 4.5 billion was

¹⁰ In FY2012 the deficit was 5.1 percent of GDP and in FY2013, it is projected to be 5.0 percent of GDP.

provided to support recession-hit export sectors of jute, leather, and frozen food. Steps have been taken to obtain a sovereign credit rating for Bangladesh to facilitate borrowing abroad by private sector industrial enterprises, and confirmation of credit lines on more favorable terms. A sovereign rating is expected to reduce the costs of trade finance through low-cost funds and loans (because lower country-risk premiums would be charged) and letter-of-credit confirmation lines.

A recovery in growth followed shortly; external trade accelerated sharply in FY2011 with both exports and imports growing by more than 40 percent year over year. Total external trade in FY2011 exceeded US\$50 billion. Apparels exports have bounced back strongly, with low labor costs retaining their competitive edge even after the recent wage hike. In the post crisis surge, exports to new markets in fast-growing Asian economies and exports of newer items like marine vessels and information technology-enabled services are gaining momentum.

Trade deficit improved to US\$3.5 billion in the first five months of FY2013 compared to the deficit of US\$4.5 billion in the same period of the preceding fiscal year. Workers' remittance received over US\$1.0 billion for each 13 consecutive months up to December, 2012 contributed to a surplus in current account balance of US\$43 million in the first five months of FY2013 as opposed to the deficit in the same period of the previous fiscal. Likewise, financial account recorded a surplus of US\$1.5 million during the same period. These developments contributed to a surplus of US\$1.8 billion in overall balances during July-November, 2012 against a deficit of US\$0.9 billion recorded during the corresponding period of the previous year. Foreign exchange reserves reached at US\$12.7 billion at end-2012 from the level of US\$9.5 billion at end FY2009; the current level is equivalent to 4.23 months' import payments.

Monetary Policy Measures

Bangladesh Bank (BB) reduced the repo rate in 2009 as a short term measure to deal with the global financial crisis. BB remains proactive in using the monetary policy tools at hand to adjust demand pressures in domestic markets from excessive monetary growth. Cash reserve requirements (CRR) for banks was enhanced in both FY2010 and FY2011, and Bangladesh Bank's policy interest rates (repo, reverse repo) were enhanced three times in FY2011 and reduced once in the second half of FY 2013.

Bangladesh Bank's guidance for local financial markets in their management of the surging financing needs of real sector entrepreneurs includes advice for helping and encouraging entrepreneurs in accessing equity and term borrowing from abroad for part of their investment needs (for which the

prevailing policy regime is very congenial). The bank also requires established well-run businesses to go public and issue equity and debt in the local capital market to raise funds instead of depending solely on bank loans.

Domestic growth was projected to be 7.2 percent in the FY2013 budget under the assumption of stable domestic and global economic conditions. However, primarily due to sluggish global economy, various forecasts highlight significant dampening influences on that growth target. BB forecasts that, in FY 2013, the real GDP growth is unlikely to be less than the previous year's average and it may exceed if the global condition improves (Output growth may range between 6.1 percent to 6.4 percent for FY 2013¹¹).

Credit Policy

Against the backdrop of the global economic downturn, Bangladesh Bank continues to keep credit conditions easy, placing emphasis on channeling liquidity into productive and supply-augmenting investments, including mandatory agricultural and small and medium enterprise activities that are expected to lead to more broad-based and inclusive growth processes while discouraging excessive consumer credit and similar demand-side lending to avoid a buildup of inflationary pressures. As the central bank of a developing country, Bangladesh Bank uses its monetary and credit policy tools in an integrated way, seeking to maintain an optimal trade-off between growth and inflation. A positive outcome of this approach has appeared in GDP growth gains, with core (nonfood) inflation remaining in the lower single digits. Domestic prices of food and fuel commodities (which are large components of headline CPI inflation) follow the trends of their import prices (the Bangladesh government subsidizes user prices of fuels and some agricultural inputs to cushion shocks from upward trends in global prices; this is a large fiscal burden).

Recently, banks were advised to limit their interest rate spread¹² within the lower single digits in different sectors other than high-risk consumer credit (including credit cards) and loans to small and medium enterprises.

Although Bangladesh Bank usually pursues a sector-neutral credit policy, however, due to excessive credit growth in nonproductive consumer goods and real estate sectors, financing policy was tightened in 2011 through an increase in the necessary minimum equity participation of the borrower, to 70 percent from 50 percent for consumer goods, and to 30 percent from 20 percent for real estate.

¹¹ Refer to Monetary Policy Statement January 2013 of Bangladesh Bank.

¹² The difference between the lending rates and the weighted average rate of interest on deposits or the intermediation spread

Strengthening the Financial System

After the global crisis, Bangladesh Bank's supervisory oversight on risk management practices in banks has been strengthened, and the cornerstone has been laid for increased activity in macroprudential supervision.

- *Risk-based capital adequacy.* To comply with international best practices and to make bank capital more risk sensitive as well as more shock resilient, Bangladesh entered into the Basel II regime on January 1, 2010, after a one-year parallel run with Basel I. Scheduled banks are required to comply with the revised regulatory framework on capital adequacy (Risk Based Capital Adequacy for Banks, which is part of the revised regulatory capital framework in line with Basel II). Basel II's Standardized Approach for Credit Risk, Standardized (Rule Based) Approach for Market Risk, and Basic Indicator Approach for Operational Risk are being followed. The capital adequacy ratio has been fixed for banks at 8 percent or more for January 2010 to June 2010, 9 percent or more for July 2010 to June 2011, and 10 percent or more for July 2011 onward.
- *Stress testing and resilience of the system.* Steps have been initiated to build up an adequate pool of stress-testing capabilities in an effort to introduce stress-testing routines to identify institutional and systemic vulnerabilities to probable stress events. Banks have been provided with core risk management guidelines for credit risks, asset and liability or balance sheet risks, foreign exchange risks, internal control and compliance risks, money laundering risks, and information and communications technology security for banks and financial institutions. Guidelines for assessing environmental risk along with credit risk for an overall credit rating before disbursement of a loan or credit facility and policy guidelines for green banking have been issued with a view to developing a strong and environmentally friendly banking system. In addition to the core risk guidelines, focusing on specific areas, overarching risk management guidelines for banks have been issued. These guidelines focus on how risk management should be governed, and give particular emphasis to capital management.
- *Bank performance analysis.* Regulatory and supervisory capacity at Bangladesh Bank is continually being upgraded. Current supervision routines include supervisory CAMELS¹³ ratings of banks based on a newly-revised set of performance indicators and qualitative assessment

¹³ CAMELS stands for capital adequacy, asset quality, management capability, earnings, liquidity, and sensitivity to market risk.

factors, early warning to banks with deteriorating trends in performance indicators, and intensive oversight on problem banks with CAMELS ratings below a specified minimum. The further development of the Enterprise Data Warehouse has greatly increased the speed at which data are available for analysis, and further improvements to the collection and editing of data and the automated generation of computerized reports for financial analysis are envisioned.

- *Loan classification and provisioning.* To strengthen credit discipline and bring classification and provisioning regulation in line with international standards, Bangladesh Bank, in late 2012, revised policies on classification and provisioning (to recognize expected loan losses at an earlier stage and to introduce more qualitative factors into the evaluation) and on rescheduling (to discourage “evergreening” of the loan portfolio). The main effect of the revised policies has been to increase the confidence in bank financial statements, which is an important component in financial stability.
- *Credit information bureau.* To ensure prompt collection of credit data from sources and instantaneous delivery of credit reports to users, online credit information bureau services opened on July 19, 2011. The service has brought huge advantages to the banking sector of Bangladesh. Physical presence is no longer needed for the collection of credit reports or the submission of credit information to the credit information bureau database.
- *Corporate governance.* Liquidity and solvency problems caused by poor governance in banks can have harmful systemic consequences in the broader economy that relies on banks for credit and payment services. Therefore, high priority is given to corporate governance in banks, including putting in place checks and balance comprising a mix of legal, regulatory, and institutional provisions that specify the roles and accountability of the board, the executive management, external and internal audit, and disclosure and transparency prescriptions. Good corporate governance can contribute substantially to a cooperative working environment between banks and their supervisors. It supports not only a well-managed banking system but also contributes to protecting depositors’ interests. Bangladesh Bank has recently taken several measures to put in place good corporate governance in banks. These include fit and proper tests for chief executive officers of private commercial banks, constitution of the board audit committee, enhanced disclosure requirements, and others. In continuing these reforms, the roles and functions of the board and management were redefined and

clarified with a view to specifying the powers of management and restricting the intervention of directors in day-to-day management of the bank.

- *Financial Stability Department.* To develop and implement macroprudential policies and monitor the stability of the entire financial sector (with special emphasis on the banking sector), Bangladesh Bank in 2012 created the Financial Stability Department (FSD). The FSD, and before it, the Department of Off-site Supervision (DOS), have issued Bangladesh Bank's first and second Financial Stability Reports. As its functions develop, it will monitor the possible accumulation of stress in the financial system, using indicators such as real estate and other asset prices, household and corporate debt, credit growth, and so forth. The FSD will monitor bank liquidity from a system-wide perspective, focusing on the interconnectedness among institutions. It will also consider the introduction of macroprudential measures such as countercyclical provisioning and capital buffers and adjusting maximum loan-to-value ratios.

A cautious supervisory stance on banking sector risk management, in broad conformity with Basel Committee on Banking Supervision standards, has served Bangladesh well in preventing large risk buildups that could threaten systemic stability. There have been rare episodes of risk-management weaknesses leading to problems in a few individual banks needing to be sorted out with Bangladesh Bank intervention, but none of these threatened instability by contagion to other banks and financial institutions.

Conclusion

The 2008–09 global financial crisis and sovereign debt crises in a number of countries have prompted policymakers to periodically review financial stability. Financial stability through macroprudential measures is gaining increasing importance in macroeconomic management toward sustainable economic growth. But the fact should also be acknowledged that macroprudential measures have limitations and need to be used in conjunction with other policies, such as monetary policy, to be effective.

Although risk-management practices in the banking sector in Bangladesh have served their purposes fairly well in averting systemic crises, there is no room for complacency; these practices must be improved and developed continuously in step with increasing the depth, diversity, and sophistication of Bangladesh's financial market and its services.

Macroprudential Practice in China

LIAO MIN

Supervisory Measures from the Macroprudential Perspective

In 2003, when the China Banking Regulatory Commission (CBRC) was first established, it worked together with the People's Bank of China (PBC) and other related authorities to prioritize China's banking reform, focusing on the systemically important institutions, that is, the state-owned commercial banks and rural credit cooperatives. Both reforms have achieved significant progress.

China has strengthened the firewall between the banking sector and capital markets, prohibiting bank credit from financing stock trading, which helped prevent further price surges during the stock market boom in 2007.

The CBRC has conducted peer-group comparisons to identify similar risk exposures and trends in the banking sector.

Since 2006, the CBRC has held quarterly meetings with the board and senior management of major banks, sharing its analyses of changing economic and financial conditions as well as views on inherent financial risks. This initiative has been widely welcomed by the Chinese banks.

Countercyclical Measures during the Economic Upswing

During the past economic upswing, the CBRC adopted a number of countercyclical measures:

- In 2007, when the housing market was overheating in many Chinese cities, the CBRC tightened the risk-management criteria for property lending. For the purchase of second homes, the loan-to-value ratio cap was lowered from 70 percent to 60 percent, and the benchmark lending rate was raised by 10 percent.
- Banks were required to increase loan loss provisions. At the end of 2008, the average provisioning coverage ratio in Chinese banks reached 116 percent.
- Banks were required to conduct securitization transactions in a prudent manner. Since 2008, the securitization of nonperforming assets has been prohibited.

Countercyclical Measures during the Economic Downturn

In early 2009, with the deepening of the global financial crisis, the CBRC adjusted a number of supervisory requirements in credit policies, including encouraging the financing of mergers and acquisitions; allowing the restructuring of certain loans; promoting the development of small business, rural, and consumer finance; and increasing the loan-to-value ratio limit for first home mortgages to 80 percent from 70 percent.

Countercyclical Measures since the Rapid Credit Growth in 2009

In view of the rapid loan growth that started in late 2008, a capital conservation and countercyclical buffer of 2.5 percent and a capital surcharge of 1 percent for large banks was implemented in 2009. At the same time, the CBRC required banks to increase their provisioning coverage ratio to 150 percent by the end of 2009. The loan-to-value ratio ceiling has been adjusted several times in response to rapidly rising housing prices. As of mid-2012, the loan-to-value ratio limit for first home mortgages is 70 percent and that for second home mortgages is only 40 percent. The CBRC issued its Rules on Leverage Ratio in June 2011. The minimum standard for the leverage ratio is 4 percent for all banks, but with different transition periods. Systemically important financial institutions (SIFIs) must comply by end-2013; others by end-2016.

Strengthening Supervision of SIFIs

The CBRC is formulating a policy framework for SIFIs.

- A methodology is being developed for identifying SIFIs. The methodology considers four categories of systemic importance—size, interconnectedness, substitutability, and complexity.
- Stricter supervisory requirements will be introduced for SIFIs. A 1 percent capital surcharge for SIFIs has been implemented. Other supervisory policies under discussion include a liquidity surcharge and stricter limits on large exposures.
- Activity restrictions and firewalls will reduce complexity and interconnectedness. In China, banks are prohibited by law from conducting nonbanking activities. However, in the past few years, some banks have been allowed to establish nonbank subsidiaries on a trial basis and with approval by the State Council.

The most important element in the SIFI policy framework is enhanced and intensified supervision. The CBRC has also worked with other

relevant agencies to improve its resolution regime and tools. To increase the resolvability of the SIFIs, the CBRC will require N-SIFIs to formulate recovery and resolution plans. Bail-in mechanisms are also being considered for the future. The CBRC will continue its efforts to enhance supervisory cooperation and coordination, especially for SIFIs, both in the cross-sectoral and the cross-border dimensions.

Mitigation of Risks Related to Economic Restructuring

The CBRC continues the practice of closely tracking economic and financial developments and communicating them to the industry, improving its risk monitoring and early warning systems, conducting regular analysis of exposures by industrial sectors, and guiding banking institutions to optimize their credit allocation and fend off risks arising from economic restructuring. Along with the efforts to implement macroeconomic adjustment policies, the CBRC further strengthened the supervision of credit exposures to industries and projects identified as high polluting, energy intensive, and with redundant capacity. In addition, the CBRC guided banking institutions to recover and resolve loans to enterprises whose production capacity was considered obsolete, and to adjust their portfolios in favor of green credit.

Mitigation of Risks Related to Real Estate Loans

In accordance with the Notice of the State Council on Firmly Containing the Surging Housing Price in Certain Cities and the latest real estate loan policies, the CBRC introduced stringent regulatory requirements in a bid to strengthen the supervision of banks' lending to real estate markets. A list of property companies was compiled for reference by banks in making property-development loans.

With respect to risk management for property development loans, banks were required to take precautionary measures such as appropriately assessing their risk exposures to property developers, conducting stringent reviews of property developers' capital adequacy and own-funding status, requiring high quality collateral, and applying dynamic management of loan-to-value ratios.

With respect to risk management for land reserve loans, banks were required to strictly assess the adequacy of collateralization to avoid reckless credit supply. For risk management of residential mortgages, banks were instructed to implement dynamic and differentiated credit policies, and to strictly adhere to the supervisory guidance on the adjustment of down payments and mortgage rates. The requirements that banks interview and sign the contract with the mortgage borrowers in person, and visit the resident property to stem speculative investment, were reiterated. In general, the CBRC closely

monitored the credit risks arising from the property market and advised banks to conduct stringent stress tests on their real estate loans and make diligent assessments of the impact of price declines and macroeconomic changes on the quality of their real estate loan portfolios.

The CBRC will review and resolve rule-breaking behaviors in real estate lending, specifically requiring banks to properly manage the loans made to real estate developers, and strengthen the verification, evaluation, and management of the corresponding collateral. Furthermore, dynamic and differentiated residential mortgage policies continue to be implemented to prevent speculation in the housing market.

Challenges ahead

The divergence in the path to recovery following the 2008–09 global financial crisis between advanced and emerging economies was pronounced. In 2011, China still faced a challenging task in boosting domestic consumption as an important driving force behind economic growth.

The increasingly severe structural overcapacity, and a growth model featuring intensive energy consumption and pollution, underscored the urgency of economic transformation and industrial restructuring. With imported inflationary pressure edging up, the work to curb inflation and maintain stable growth faced a harsh test.

Economic Growth and Industrial Structure Transformation

In 2011, China's GDP grew by 9.2 percent year-on-year, a decrease compared with 10.3 percent in 2010; the consumer price index increased cumulatively by 5.4 percent; and the producer price index increased by 6.0 percent. With the double pressure of slow economic growth and increasing inflation, industrial restructuring was more urgent and efforts were further intensified. During the Eleventh Five-Year Plan period, the obsolete capacity in some industries, including iron and steel, coke, cement, and paper making, was decreased by 50 percent; the emissions reduction target for sulfur dioxide was achieved one year ahead of schedule, the target for chemical oxygen demand half a year ahead, and that for energy consumption per unit of GDP was completed on schedule.

Real Estate Loans

Although an array of adjustment measures have been taken to ensure stable and sound development of the housing market, certain deep-rooted factors that may lead to housing bubbles still exist. Because the housing market has long-term and significant implications for the well-being of the banking sector, it is vital that banks participate in the management of housing market

risks, particularly with regard to land reserve loans and lending to real estate developers.

Prevention and Mitigation of Systemic Risk

Although a wide range of instruments and tools under the macroprudential framework have been proposed and implemented, finding the trigger point and sending warning signals to the market in an accurate and timely way is still the most difficult job. The techniques for monitoring, measuring, preventing, and mitigating systemic risk are still limited and inadequate, and need further development.

Internationally, the uncertainty of the U.S. economic recovery, the risks to euro area financial stability, and an environment of weakening macroeconomic growth prospects cast doubt on the effectiveness of the current initiatives. Nationally, the banking sector is becoming larger and more globally connected, thus increasing the difficulty of systemic risk management. Furthermore, in the context of interest rate and exchange rate liberalization, the increasing business complexity, sophistication, and interconnectedness of the banking sector make the task even more difficult.

A broader vision is needed when managing systemic risk. The 2008–09 global financial crisis shows that during a debt cycle, the leverage ratios of four sectors—government, household, financial, and nonfinancial—are correlated and may interact with each other. Since the crisis, the financial sector leverage ratio has been closely monitored and controlled, but the other three sectors need the same level of attention. Therefore, management of systemic risk from the banking sector cannot and should not rely only on regulatory and central bank efforts. All relevant government authorities should also give serious thought to the issue of systemic risk when formulating their policies, and a smooth, prompt, cooperative, and coordinated mechanism should be in place to deal with all possibilities. However, in China, given the government’s influence over economic activity, monitoring and controlling the government sector’s leverage ratio is particularly important for improving the management of systemic risk.

Macroprudential Infrastructure in Cambodia

BUY BONNANG PAL

Macro-Financial Linkage

The link between the real sector and the financial sector in Cambodia is relatively strong as witnessed during the economic slowdown in late 2008

and 2009. The collapse of four major sectors of the economy—garments, tourism, construction, and agriculture—significantly affected the banking sector as the nonperforming loan ratio almost doubled. Conversely, the lack of credit to the real sector, coupled with depressed consumption and investment, has prolonged recovery of the real sector, which increases concerns in the banking sector because of profitability and liquidity tightening.

Macroeconomic Policies

Before the 2008–09 global economic and financial crisis, Cambodia experienced a period of rapid growth fueled by easy monetary policy and large capital inflows, especially via cross-border banking. Credit expanded rapidly, averaging growth of more than 50 percent per year. Easy monetary policy coupled with fiscal expansion led to an asset-price bubble, especially in the real estate sector given the absence of a capital market.

At the same time, inflation pressures resulting from high oil prices and the food price crisis necessitated intervention by the authorities. Reserve requirements were doubled and fiscal expenditure was tightened to fight inflation and to mitigate the asset bubble. These policy actions, although effective at lowering inflation and asset prices, produced negative externalities as liquidity in the banking system was squeezed and a credit crunch emerged. Consumption and investment were also scaled back, causing a recession in the overall economy.

Easing monetary policy and providing fiscal stimulus were required for the authorities to put the economy back on track. Reserve requirements and liquidity facilities support were adopted and tax exemptions and reductions in tax rates were implemented for key sectors. In short, policies for macroeconomic management in Cambodia were in place that allowed imbalances to build up over time and also contributed to procyclicality both before and during the global crisis.

Microprudential Measures

Cambodia still complies with Basel I and is in transition to Basel II. Given the less complicated banking system in Cambodia, adopting Basel II or Basel III is less of a priority. However, key ideas introduced by Basel II and Basel III are important to updating the regulatory and supervisory regime in the country. The capital standard in Cambodia (the capital adequacy ratio) has always been high, almost double the international standard. In this sense, the 15 percent minimum capital adequacy ratio already encompasses the capital buffer and the procyclicality buffer. This capital adequacy level also limits the

leverage ratio of banking institutions to 1:6 (borrowing up to six times capital is allowed). The definition of capital has been updated as recommended by Basel III, and the requirements for an additional capital surcharge have been put in place. Despite this progress, the liquidity rule remains lacking and is being updated to align it with international standards.

Macprudential Measures

Macprudential Tools

The macroprudential policy instruments adopted consist of reserve requirements, loan-to-value ratios, caps on credit expansion or credit growth to high risk sectors, monitoring of currency mismatches and maturity mismatches, and additional capital and provisioning. Reserve requirements have served as both monetary policy and prudential tools. Reserve requirements have proved to be effective at mitigating credit expansion and providing reserves for liquidity shortages within banking institutions. Loan-to-value ratios also serve as important instruments to curb credit expansion and risk-taking behavior of the banking institutions. Caps on credit to high-risk sectors were adopted in early 2008 during the credit and real estate bubble, but it was abolished in early 2009 to ease credit flows as well as to stimulate growth. Monitoring of currency mismatches and maturity mismatches has been conducted as part of the assessment of currency and liquidity risks, but these instruments also serve as macroprudential tools. Any signs of distress resulting from currency and maturity mismatches would require immediate remedial actions. Additional capital buffers and provisioning have also been adopted to improve loss-absorbing capacity and to strengthen banking institutions' positions against possible shocks, especially against the impact of the global crisis.

Some of the tools were adopted specifically to prick the bubble in the real estate sector. However, in general, the tools are used to achieve the ultimate target of ensuring stability in the banking sector and the financial sector as a whole. The main criteria for choosing the instruments are their simplicity and their effectiveness. In practice, the instruments have proved to mitigate risk effectively and achieve the ultimate objective of ensuring stability. In particular, the reserve requirement plays a significant role, influencing credit growth, liquidity, and the risk-taking behavior of institutions. The cap on credit to high-risk sectors also directly affects banks' credit expansion and promotes diversification rather than concentration of credit portfolios. Additional capital and provisioning works best to enhance banking institutions' solvency positions and ability to absorb losses. It helps to counteract adverse shocks to the system, especially during economic downturns. However, monitoring currency mismatches and maturity mismatches is constrained in achieving its objectives because of the high

degree of dollarization and the level of development of the local market, in which long-term sources of funds are scarce.

Correctly assessing the costs and impacts is the major challenge in adopting effective macroprudential instruments. Because the Cambodian financial market is at an early stage of development, the evidence of the outcomes of these instruments is somewhat uncertain.

Instruments need to be regularly tested and assessed to ensure their effectiveness. But, instruments also need to be aligned with the circumstances and conditions of the specific market in which they are to be used. For instance, increasing the reserve requirement ratio and placing restrictions on credit portfolios were considered to be appropriate measures in response to the asset-price bubble; however, these actions led to a liquidity shortage in the system requiring that the policy stance be eased so that the reserve requirement was reduced and the cap on credit portfolios was abolished.

Monitoring Systemic Risk

There are no available indicators for identifying systemic risk in the Cambodian financial sector as yet. An initiative is under way to identify systemic risk within the banking sector, focusing on systemically important banks (SIBs).

Relevant indicators applied to the SIBs include asset quality, liquidity, management, capital, profitability, and sensitivity to market risk. Employing common indicators to assess systemic risk is being reviewed. In the Cambodian market, the major sources of vulnerability originate from liquidity and solvency issues. Indicators relevant to liquidity and solvency risk, such as liquidity coverage, sources of funds, solvency ratios, and nonperforming assets, are the major tools for macroprudential monitoring as well as for monitoring systemic risk. In addition, macroeconomic indicators are also used for monitoring purposes. Leading indicators such as financial deepening, inflation, and money supply have been adopted. However, additional indicators need to be developed to effectively monitor the development of the market.

The systemic risk assessment methodology at present is very basic. There is no formal procedure and no specific quantitative or qualitative model employed to review systemic risk. Indeed, no macroprudential stress test is carried out by the central bank. The macro-financial linkage stress test is a new concept in Cambodia and little progress has been made on this issue. A sample stress test was conducted with assistance from the IMF, but there were questions about its effectiveness and its usefulness.

Basel III Proposal

Macroprudential tools proposed by Basel III, consisting mainly of capital buffers, procyclicality buffers, and leverage ratios, are less relevant to the Cambodian context given the fact that the capital standard in the country is relatively high compared with the international standard for capital adequacy. The business environment in which the banks operate and the lack of risk-management tools give rise to the need for a higher capital standard. In addition, banking is a fast-growing industry in the country and capital needs to be built up for future expansion as well as to absorb losses.

Managing Capital Flows

Capital flows into the country have been in the form of direct investment, remittances, and cross-border banking resulting from the lack of a money market and a capital market. Remittances and direct investment have been regarded as the most stable capital flow events during the global crisis. Cross-border banking, however, is the most volatile capital flow. Before 2008, cross-border capital inflows were high—and fueled both the growth of credits and the real estate bubble in the country. Once the capital retreated, the banking system as a whole experienced a liquidity shortage, rising nonperforming loans, and compressed liquidity. Liquidity and solvency of the system became the major concerns. Prudential measures were then placed on short-term cross-border banking capital flows and it proved effective in mitigating the risk.

Challenges for Adoption of Macroprudential Regulations

Institutional Setup

The law does not specifically provide a mandate for financial stability to the National Bank of Cambodia (NBC) or to other agencies in the country. However, because the banking sector is the dominant player in the financial sector, the NBC has taken the initiative to perform a major role in financial stability, but in collaboration with other regulators, for example, the Securities and Exchange Commission of Cambodia and the ministry of the economy and finance. Similarly, no formal legal mandate exists for macroprudential policy. Currently, the NBC is proposing that the Central Bank Law and the Law on Banking and Financial Institutions be amended so that it can carry out the function of financial stability, including macroprudential policy. The proposed amendment is being discussed at the council of ministers and once completed, the proposal will be sent to the National Assembly for endorsement. The draft amendment does not define macroprudential policy. However, it is the intention of the policy to reduce systemic risk and to include a crisis-management function.

Given the current structure of the financial system in Cambodia, the responsibility for macroprudential policy is shared between the NBC and the ministry of economy and finance, but the NBC plays the leading role. At the institutional level, the NBC has already established a financial stability committee and a financial stability unit to carry out this new mandate; at the national level, the financial stability commission has not yet been set up. Discussions are under way between the NBC and the ministry of economy and finance to institutionalize the function of financial stability at the national level and to initiate the role of crisis management.

Ensuring Effectiveness of Macroprudential Policies

Using the right tools for the right jobs and ensuring coordination among related institutions have been considered to be the keys factors for maintaining stability. Given the tools available, deciding on which tools to use is the most challenging part of the process. The cost and impact of each policy instrument needs to be carefully assessed. Communicating with related institutions to ensure the right tools are employed is also important. Enormous energy and effort are sometimes required to convey an understanding of the policy instrument.

Domestic and International Coordination

Coordination with related institutions is essential for the success of the macroprudential policy. Effective communication among the authorities needs to be in place. International coordination is also important to understand the risk at a regional level as well as to participate in regional efforts to enforce common instruments.

Macroprudential Policy Framework: The Republic of Korea

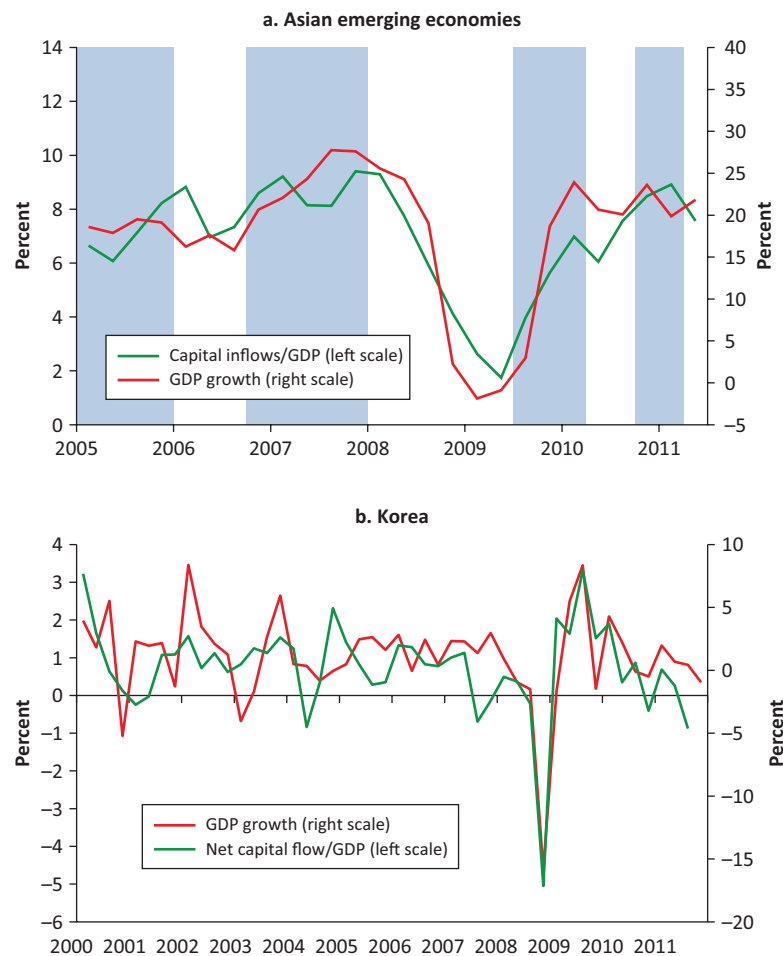
TAE SOO KANG

Potential Systemic Risks Unique to Korea

Increased capital flow volatility and household debt are potential sources of systemic risk that Korea is currently confronting. These two risk factors contribute to procyclicality, implying that the Korean economy is exposed more to systemic risk in the time-series dimension than in the cross-sectional dimension.

Capital flow volatility's amplification of business cycle fluctuations is a systemic risk factor common to emerging Asian economies. It may be conjectured that this phenomenon has been caused by emerging Asian economies' heavy reliance on capital inflows for credit, rather than on funding by domestic bank deposits (Figure 3.12).

Figure 3.12. Korea: Ratio of Capital Flows to GDP and GDP Growth

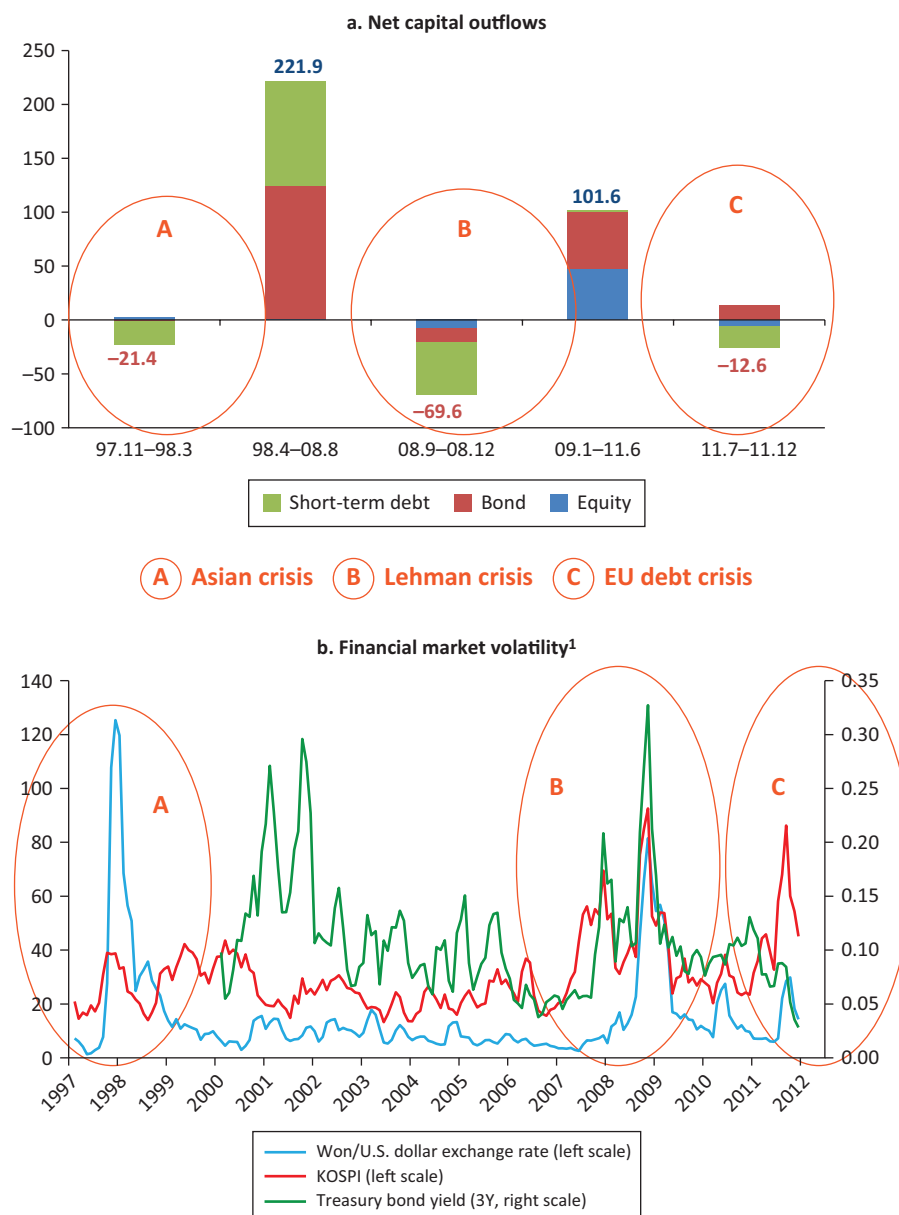


Source: Bank of Korea.

Sudden reversals of capital flows have repeatedly occurred at periods of deterioration in the external financial environment and have consequently led to higher volatility in important market indicators such as exchange rates, interest rates, stock prices, and others (Figure 3.13).

The rapid buildup of household debt is another systemic risk factor in Korea. The ratio of household credit to disposable income reached its highest-ever level (155 percent as of 2010; Figure 3.14, panel a). The principal concern about household debt is the vulnerability in its structure. Most household loans are installment loans without regular amortization of principal, and interest is at floating rates (Figure 3.14, panel b). Under the current debt structure, household solvency could be rapidly undermined by rising interest rates or banks' pressure for loan redemption caused by worsening economic conditions at home and abroad.

Figure 3.13. Korea: Effect Capital Flows on Volatility



Source: Bank of Korea.

Note: EU = European Union; KOSPI = Korea Composite Stock Price Index.

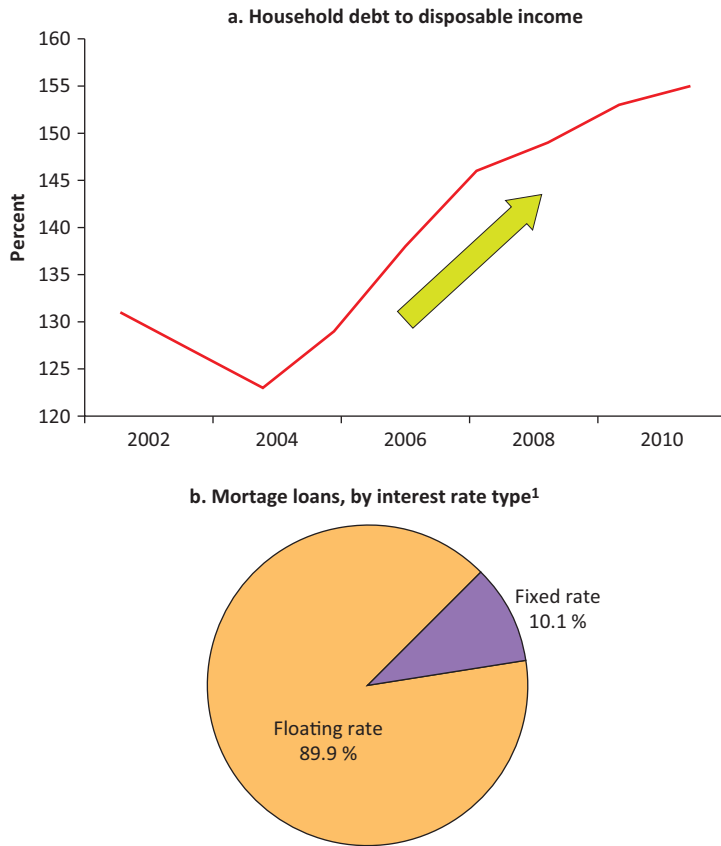
¹Three-month moving average of standard deviation.

Macroprudential Measures Deployed

Responses to Capital Flow Volatility

The Korean authorities have strived to mitigate capital flow volatility by employing a macroprudential policy aimed at stabilizing short-term capital inflows and establishing safeguards against sudden capital outflows (Figure 3.15).

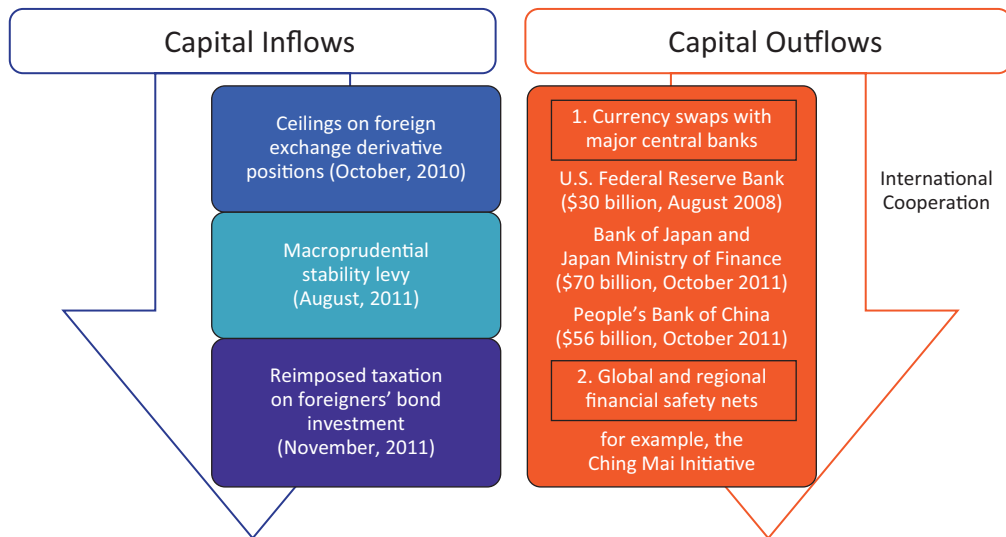
Figure 3.14. Korea: Household Debt and Mortgage Loans



Source: Bank of Korea.

¹Nine major domestic banks, as of end of 2011.

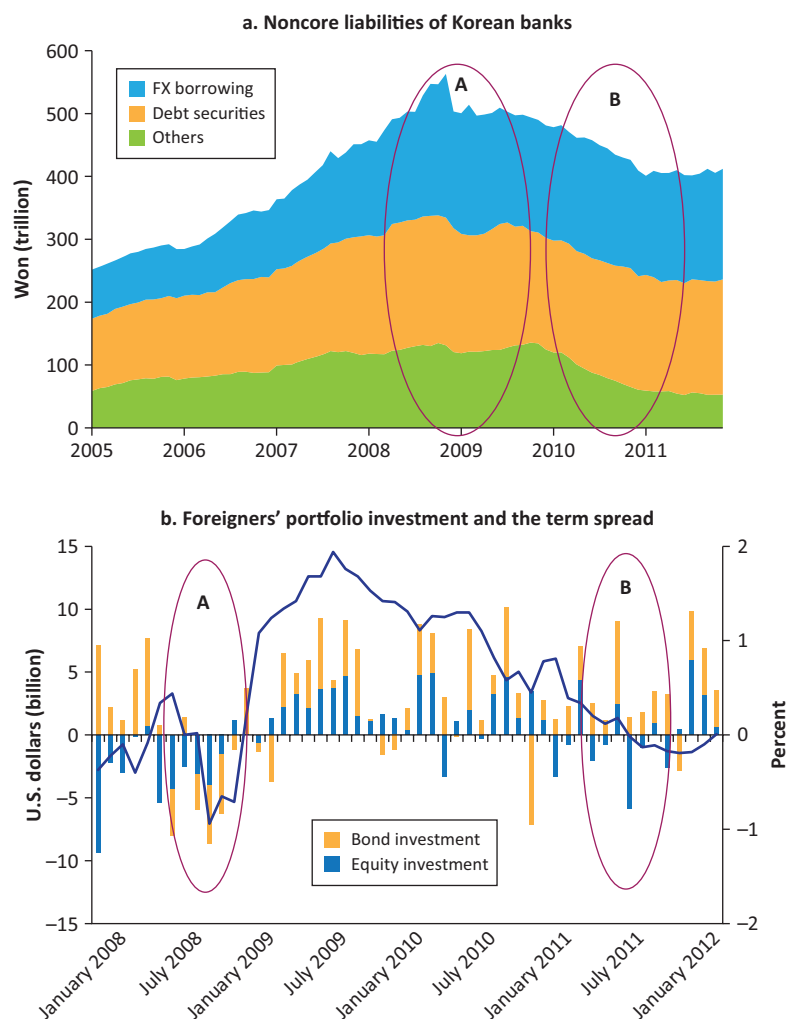
Figure 3.15. Korea: Macroprudential Response to Capital Flow Volatility



Source: Bank of Korea.

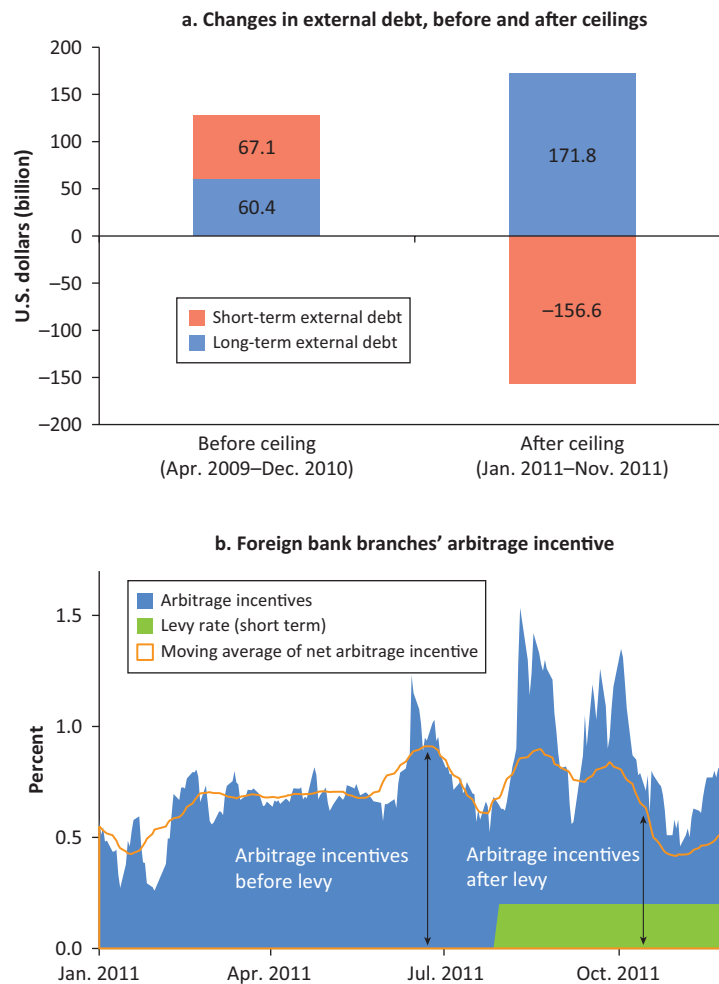
Macroprudential policy tools, such as ceilings on foreign exchange derivative positions, the macroprudential stability levy, and the taxation of foreigners' bond investments, were implemented with a focus on the stabilization of short-term capital inflows, thereby minimizing negative side effects on the financial system and the economy. In open emerging markets, noncore liabilities usually take the form of short-term external debt, which, when accumulated in excess, increases vulnerability to the outbreak of a crisis (Shin and Shin, 2010). Moreover, high capital flow volatility can cause interest and foreign exchange rates to deviate from economic fundamentals and distort term structures, thereby weakening the monetary policy transmission channel (Figure 3.16).

Figure 3.16. Korea: Effect of Macroprudential Policies on Foreigners' Investment



Source: Bank of Korea.

Figure 3.17. Korea: Effect of Macroprudential Tools on Debt



Source: Bank of Korea.

So far, the macroprudential policies have proved to be effective, reducing short-term external debt, reducing arbitrage incentives, and increasing the share of foreigner's investment in long-term bonds (Figure 3.17).

Responses to Rapid Increase in Household Debt

In response to household debt, the debt-to-income (DTI) and loan-to-value (LTV) ratio regulations have been tightened, which has been effective in the short term. However, more work is needed to establish how much of the change in housing prices and loan growth is attributable to macroprudential policy tightening (Figure 3.18).

Figure 3.18. Korea: Housing Indicators (Seoul Area) before and after Loan Regulation Tightening



Sources: Bank of Korea; Kookmin Bank; and Korean Ministry of Land, Transport, and Maritime Affairs.

Note: Comparison between six-month periods before and after strengthening of loan regulation.

Possible Obstacles to Implementation

Asymmetry in their impacts when addressing procyclicality is pointed out as a weakness of macroprudential measures such as countercyclical buffers and

dynamic provisioning, ceilings on loan-to-income and DTI, and adjustments of risk weights on specific exposures. There are claims that these macroprudential measures are less effective in alleviating credit supply contractions during economic downturns than in holding down credit expansion.

Countercyclical Buffers and Dynamic Provisioning

Countercyclical buffers, dynamic provisioning, and adjustments of risk weights on specific exposures are measures taken to reduce procyclicality within the capital regulation framework. These measures either adjust the capital ratio K or the risk weight w in the general formula for capital regulation:

$$K = \frac{E}{w \times A}, \quad (3.1)$$

in which K is the capital ratio, E is equity, w is the risk weight, and A is asset value.

For countercyclical buffers, it has been assumed that if the authorities were to increase the capital ratio in times of credit expansion, banks would downsize their assets and credit supply, and if the authorities were to decrease the capital ratio during times of credit contraction, banks would be more lenient in scaling back their credit supply. However, in times of credit expansion, banks' improved profitability would increase their net worth ($E \uparrow$) and would lower risk weights ($w \downarrow$), both bringing about higher capital ratios for the banks ($K \uparrow$). Under such circumstances, the banks may choose to continue increasing their exposures to high-risk, high-return assets regardless of the increased burden of countercyclical buffers. Also, the effects of the current countercyclical buffers may be offset by time lags or they may be less effective during periods of rapid credit expansion, given that banks are given a grace period of up to 12 months to meet the targets.¹⁴ Dynamic provisioning is subject to the issue of time lags as well, given that the additional charges are determined by past data and that the banks could postpone meeting their reserve requirements until the end of the fiscal year. In times of credit contraction and uncertainty about the duration of a crisis, however, banks are likely to opt to maintain capital buffer targets set during the past boom, out of concern that declines in their capital ratios might be interpreted as a worsening of their financial soundness. See Figure 3.19.

DTI and LTV Regulations

Ceilings on DTI and LTV ratios are means of directly limiting excessive credit supply, and are therefore effective in limiting excessive credit provision by banks during economic upturns. But they may be less effective in improving

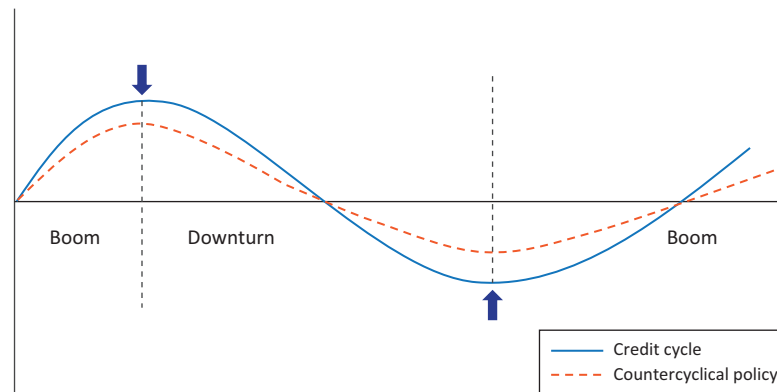
¹⁴ To give banks time to adjust to a buffer level, a jurisdiction will pre-announce its decision to raise the level of the countercyclical buffer by up to 12 months (Basel III rule text paragraph 141).

liquidity conditions or the supply of credit because, despite the easing of LTV and DTI limits, banks are likely to focus on cash hoarding rather than lending. Empirical analysis shows that stricter LTV and DTI regulations have had significant effects on loan size in Korea but there has been less effect when they are loosened (Figure 3.20 and Table 3.5).

Adjustment of Risk Weights on Specific Exposures

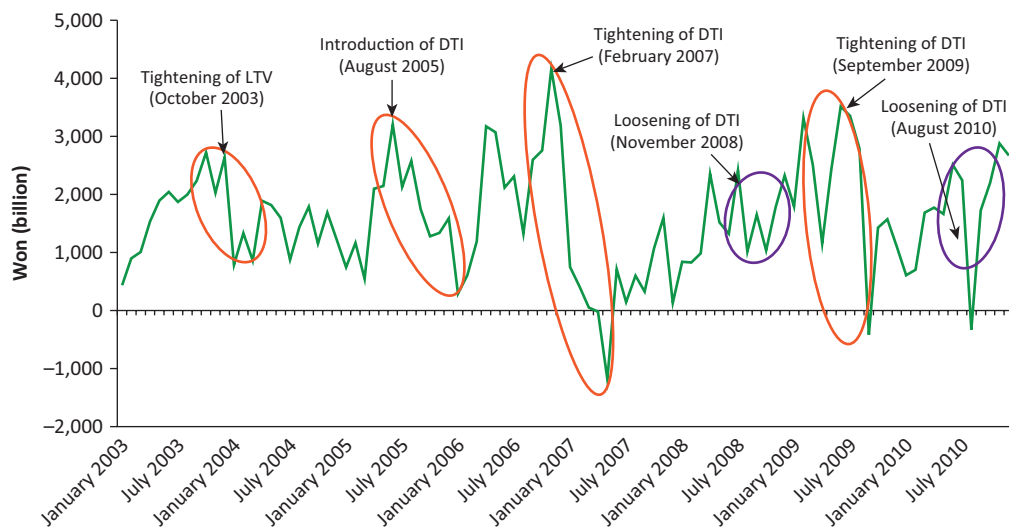
Adjusting the risk weights on specific exposures provides incentives to reduce exposures to an asset class by requiring more capital and adjusting the risk

Figure 3.19. Operating Mechanism and Effectiveness of Countercyclical Buffers



Source: Author's calculations.

Figure 3.20. Korea: Mortgage Loan Fluctuations



Source: Bank of Korea.

Note: DTI = debt-to-income ratio; LTV = loan-to-value ratio.

Table 3.5. Determinants of Loan Size

		Dependent variable: Household loans (with income information)					
		2006 (Tighter DTI)	2007 (Tighter DTI)	2008 (Eased DTI)	2009 (Tighter DTI)	2010 (Eased DTI)	2011 (Tighter DTI)
Financial variables	Log (collateral value)	0.705***	0.622***	0.653***	0.782***	0.687***	0.621***
	Income of borrower	0.009***	0.022***	-0.003***	0.010***	0.014***	0.011***
	Interest rate (CD yield) ¹	-0.072***	-0.029***	-0.095***	-0.136***	-0.043***	0.072***
	High credit ² dummy	0.082***	0.038***	-0.059***	0.089***	0.046***	0.048***
	Gangnam ³ dummy	0.045***	0.075***	0.171***	0.003***	0.088***	0.111***
Nonfinancial variable	Interest only payment ⁴ dummy	-0.164***	-0.043***	0.059***	0.118***	0.101***	0.006***
	Group loan dummy	-0.019***	0.017***	0.035***	0.089***	0.083***	-0.007***
	Business owner ⁵ dummy	0.023***	0.024***	0.026***	0.042***	0.034***	0.029***
	Maturity	0.025***	0.021***	0.015***	0.015***	0.020***	0.023***
Regulatory variables	LTV dummy	-0.093***	-0.046***	0.004***	-0.102***	-0.031***	-0.116***
	DTI dummy	-0.051***	-0.096***	-0.066***	-0.046***	-0.008***	-0.019***
	Constant	2.431***	2.858***	3.110***	1.230***	1.963***	2.583***
Adjusted R ²		0.364	0.308	0.295	0.332	0.292	0.282
Observations		48,016	35,530	55,698	71,545	72,481	40,985

¹ Rates at the time of loan.

² Borrowers with high credit ratings (1–4) = 1, others = 0.

³ Loans at the Gangnam District = 1, others = 0.

⁴ Loans with only the interest repaid = 1, others = 0.

⁵ Borrowers that own individual businesses = 1, others = 0.

* = significant at 90 percent, ** = 95 percent, *** = 99 percent, respectively. (Test statistics are adjusted for heteroskedasticity.)

weight upward when the credit risk related to the specific asset class increases. However, banks may respond to an upward adjustment of risk weights in an unintended manner, by recapitalizing ($E \uparrow$) or reducing other low-return exposures ($A_j \downarrow$) rather than reducing their exposure to the profitable asset class ($A_i \downarrow$), in which case the policy would be less effective. According to Francis and Osborne (2009), only 25 percent of banks reduced their exposures to the targeted risky assets, whereas 50 percent recapitalized and 25 percent reduced exposures to other asset classes. The banks' responses to risk weight adjustment is given by equation (3.2):

$$\bar{K} = \frac{E \uparrow}{w_i \uparrow A_i \downarrow = w_j A_j \downarrow} \Rightarrow: \text{intended response, } \Rightarrow: \text{actual response} \quad (3.2)$$

Macroprudential Framework and Measures: The Indonesian Experience

SUKARELA BATUNANGGAR

Overview of Financial System Stability Framework

As a result of the Asian crisis of 1997–98, awareness of the importance of maintaining financial system stability grew. The roles of maintaining monetary stability and promoting financial system stability are closely related. Both roles aim to achieve macroeconomic stability (Batunanggar, 2002, 2005).

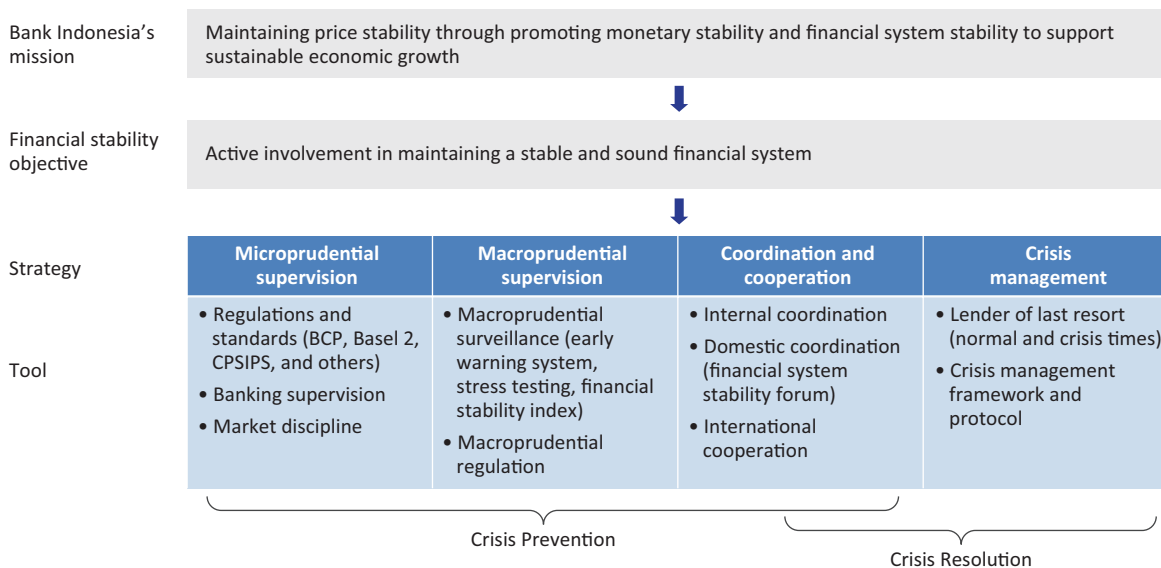
Bank Indonesia (BI) formulated a financial system stability framework and established a unit responsible for overseeing financial system stability in mid-2003. In line with the enactment of Law No. 23 of 1999, BI incorporates financial system stability in its mission “to achieve and maintain stability of the Indonesian rupiah through maintaining financial stability and promoting financial system stability for sustainable national development.” In accordance with its mission, BI formulated a framework that contains the objective, strategy, and instruments required for maintaining financial system stability. BI’s goal is to play an active role in maintaining Indonesia’s financial system stability.

Since the late 1990s, there has been an increasing trend in the establishment of dedicated units in central banks to perform financial stability functions and publish financial stability reports. In mid-2003, BI established a new unit, the Bureau of Financial System Stability, responsible for performing macroprudential surveillance to identify major risks to Indonesia’s financial system and for proposing macroprudential policies to complement monetary policy. Since then, BI has also published the biannual *Financial Stability Review*, which discusses development of the financial system and analyzes systemic risks, as well as proposes policy recommendations to mitigate such risks (Santoso and Batunanggar, 2007).

To achieve a stable financial system, BI has adopted four strategies: microprudential supervision, macroprudential supervision, coordination and cooperation, and crisis management (Figure 3.21).

Microprudential supervision. Microprudential supervision is aimed at identifying and mitigating the idiosyncratic risks in individual financial institutions, especially banks, to create and maintain a safe and sound banking system. Consistent implementation of international prudential regulations and standards are required as a sound basis for both regulator and the market players in conducting their business. In addition, consistent discipline of the market players needs to be fostered. Microprudential supervision will be

Figure 3.21. Bank Indonesia’s Financial System Stability Framework



Source: Bank Indonesia.

Note: BCP = Basel Core Principles; CPSIPS = Core Principles for Systemically Important Payment Systems.

performed by the newly established Financial Services Authority (FSA), with the transfer of banking supervision from BI in January 2014.

Macroprudential supervision. Macroprudential supervision is focused on identifying and mitigating systemic risks in the financial system to create and maintain financial system stability. Macroprudential supervision covers two areas: macroprudential surveillance and macroprudential regulation. Risks that may endanger financial system stability are measured and monitored by the use of several tools and indicators, including an early warning system that is composed of microprudential and macroprudential indicators, as well as stress testing. Analysis of the threats to financial stability can be accomplished by focusing on risk factors originating within and from outside the financial system. Research and surveillance are aimed at producing recommendations for macroprudential policy and regulations for maintaining financial system stability.

Crisis management. A safety net and crisis management framework and protocol are required for resolving a financial crisis, once it occurs. These tools include policy and procedures for serving as the lender of last resort, and deposit insurance, which has replaced the blanket guarantee. Before 2004, there was no clear legal framework for crisis resolution in Indonesia. According to Law No. 23/1999, BI is only allowed to provide lending to address liquidity problems faced by banks during normal times, but not in a systemic crisis situation. The 2004 amendment of the Bank Indonesia Law stipulates BI’s role as lender of last resort in the event of crisis. BI can provide emergency

liquidity assistance for a bank with systemic risk, complemented with a government guarantee.

Coordination and cooperation. Coordination and cooperation with related agencies is crucial, especially in times of crisis. The Financial System Stability Forum (FSSF) was formed based on a memorandum of understanding signed December 30, 2005, between the Minister of Finance and the Governor of Bank Indonesia. The FSSF serves as a venue for coordination and information sharing among the authorities. Under the Financial Services Authority Law of 2011, a Financial System Stability Coordination Forum was established, composed of the Minister of Finance, Governor of Bank Indonesia, the head of the Board of Commissioners of the FSA, and the head of the Board of Commissioners of the Indonesian Deposit Insurance Corporation (IDIC).

Institutional Arrangement for Maintaining Financial System Stability

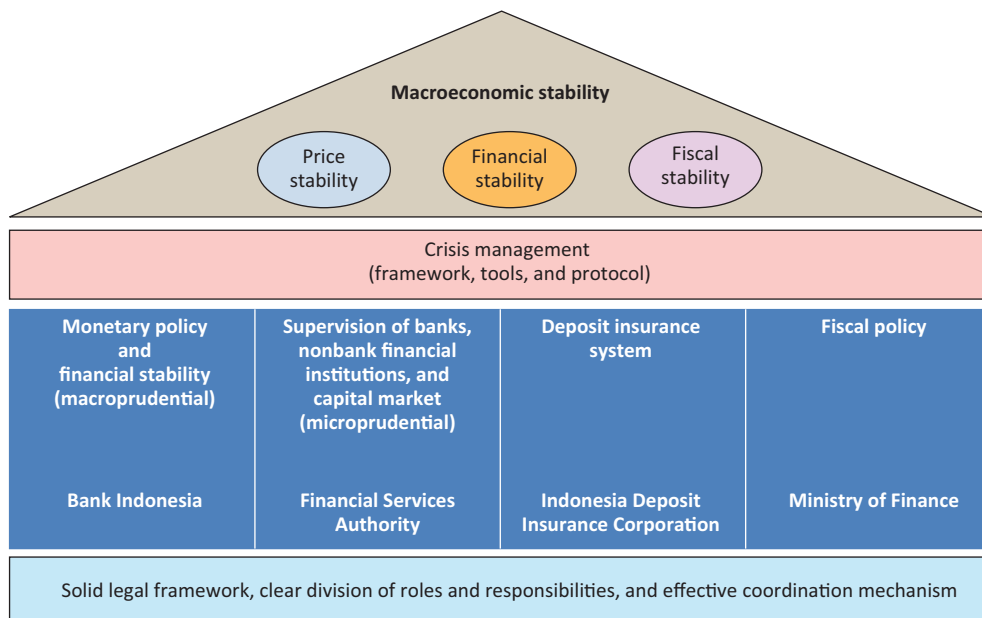
There are four financial safety net players in Indonesia: BI is the monetary authority responsible for monetary stability and financial system stability; the FSA is responsible for microprudential supervision and regulation of financial institutions and capital markets; the IDIC is responsible for administering the deposit insurance scheme and resolution of failed banks; and the ministry of finance is responsible for fiscal stability.

Banking supervision will be transferred from BI to the FSA in January 2014. The FSA law states that the FSA is responsible for microprudential supervision of financial institutions and capital markets, while BI is responsible for macroprudential policy. In addition, BI still can perform special on-site examinations of systemically important banks and certain other banks in line with its task of macroprudential policy. However, the complete division of authority between macroprudential and microprudential needs to be clearly defined by BI and the FSA and spelled out in a memorandum of understanding.

The division of responsibilities among BI, FSA, and IDIC, based on their respective enabling legislation, is summarized in Figure 3.22 and Table 3.6.

The Indonesian financial safety net framework was developed in 2003 and includes roles and responsibilities, policy measures, and coordination mechanisms among financial safety net players in Indonesia for preventing and resolving crises (Batunanggar, 2003 and 2007). The coordination mechanism was initially stated in a memorandum of understanding, then in

Figure 3.22. Financial Safety Net Player in Indonesia



Source: Bank Indonesia.

the draft of the Indonesian Financial Safety Net (IFSN) Law (summarized in Table 3.7), and currently in the FSA Act of 2011. The coordination mechanism among financial safety net players in Indonesia, based on the FSA Law and the draft of IFSN Law, is summarized in Table 3.8.

Post-Global Crisis Macroprudential Policy Measures

As a response to the 2008–09 global financial crisis, BI adopted macroprudential policy measures integrated with banking supervision (microprudential policy) and monetary policy. The policy measures are aimed at two key objectives: first, to mitigate the risk from short-term and speculative capital inflows, as well as the risk of sudden reversals in capital flows; and second, to enhance the effectiveness of liquidity management and to mitigate risk from capital inflows by attempting to lock them up longer and thereby also help to develop the financial markets. Macroprudential policy measures in Indonesia subsequent to the global crisis are summarized in Table 3.9.

Indonesia’s exchange rate policy is directed to ensuring that the rupiah’s value is stable and consistent with macroeconomic development. Amid rapid foreign capital inflows and appreciation pressures in 2010, BI undertook exchange rate stability policy to minimize exchange rate volatility. Because of the complexity of the problems, intervention

Table 3.6. Division of Roles and Responsibilities among Financial Safety Net Players in Indonesia

	Bank Indonesia (BI)	Financial Services Authority (FSA)	Indonesia Deposit Insurance Corporation (IDIC)
Legal basis	BI Law No. 23 of 1999 and amendment No. 3 of 2004	FSA Law No. 21 of 2011	IDIC Law No. 24 of 2004
Objectives	To achieve and maintain the stability of the rupiah value (<i>through maintaining monetary stability and financial system stability</i> ; proposed revision).	To ensure that the overall activities in the financial services sector are <ul style="list-style-type: none"> • managed in an orderly way, fairly, transparently, and with accountability; • able to realize sustainable growth and stable financial system; and • able to protect the interests of consumers and society as a whole. 	<ul style="list-style-type: none"> • Insure customers' deposits • Actively participate in maintaining the stability of the banking system in accordance with its authority
Key tasks	<ul style="list-style-type: none"> • To formulate and implement monetary policy • To regulate and safeguard the payment system • To regulate and supervise banks (until January 2014) • (<i>To promote financial system stability</i>; proposed revision) 	To perform integrated regulatory and supervisory oversight of all activities of the financial services sector, including banking, insurance, pension funds, investment companies, and other financial institutions, as well as the capital markets	<ul style="list-style-type: none"> • Formulate and determine implementation policies of deposit insurance • Implement the deposit insurance program • Formulate and implement the resolution policy for failing banks that do not have a systemic impact
Crisis Management and Protocol	To provide liquidity support to the banking system or to individual banks with systemic impact under a government guarantee	To provide information about and analysis of problem financial institutions that have a systemic risk impact	Handle failing banks subject to systemic risk
	Ministry of finance, BI, FSA, IDIC, and Financial System Stability Forum have developed a crisis management protocol, at both the institutional and the national level, to prevent and resolve crises.		

Source: Bank Indonesia.

policy alone was insufficient, and required complementary adoption of macroprudential policy. In this regard, BI introduced a one-month holding period for Bank Indonesia Certificate purchases in June 2010. In addition, BI implemented other policy measures to address the rapid pace of foreign capital inflows.

Table 3.7. Key Content of Indonesian Financial Safety Net Law Final Draft

Element	Key Content
Main objective	<ul style="list-style-type: none"> To create and maintain financial system stability To prevent systemic risk and to contain financial crisis
Coverage	<ul style="list-style-type: none"> Banks and insurance companies with systemic risk implications Crisis in government securities market
Governance body	Financial System Stability Forum, the main functions of which will be to determine systemic impacts and enact crisis statutes as well as to devise prevention and resolution strategies
Measures	<p>Liquidity problems</p> <ul style="list-style-type: none"> Emergency liquidity assistance for banks from BI or the government Liquidity assistance for insurance companies from the Indonesian Deposit Insurance Corporation (IDIC) <p>Solvency problems</p> <ul style="list-style-type: none"> Temporary investment in banks and insurance companies by IDIC <p>Government securities problems</p> <ul style="list-style-type: none"> Government or BI to buy government securities in the secondary market as crisis-prevention measure Government to buy back government securities or BI to buy government securities in the primary market as crisis-resolution measures
Sources of funds	<ul style="list-style-type: none"> BI (guaranteed by the government) for systemic liquidity assistance for banks State budget for systemic liquidity assistance for banks in a crisis IDIC for systemic liquidity and solvency assistance for insurance companies
Private sector solution	<ul style="list-style-type: none"> Private sector may be involved in the resolution of bank and insurance companies Securities issued by banks may be converted into capital (contractual bail-in) Obligations to policyholders for insurance companies may be restructured (contractual basis)
Crisis management protocol	BI, IDIC, ministry of finance, and Financial Services Authority (FSA) must have a crisis management plan in place
Information sharing	BI, IDIC, ministry of finance, and FSA share information related to crisis prevention and resolution with the Financial System Stability Forum (FSSF)
Accountability and reporting	<ul style="list-style-type: none"> FSA to announce its report to FSSF concerning systemic impact of banks and insurance companies within three months after FSSF releases decisions on crisis prevention and resolution FSSF to periodically report about the handling of bank or insurance company problems to the president The president to submit a formal report on crisis prevention and resolution to the parliament based on the FSSF report

Source: Bank Indonesia.

Table 3.8. Coordination Mechanisms among Financial Safety Net Players in Indonesia

Aspect	Coordination Mechanism
Prudential regulation	Financial Services Authority (FSA) coordinates with Bank Indonesia (BI) in formulating banking regulations, such as capital adequacy, banking information systems, offshore borrowing, banking products, determination of systemically important banks, and data that are excluded from secrecy.
On-site examination and bank rating	<ul style="list-style-type: none"> • BI can perform special on-site examinations of certain banks by sending a prior written notice to the FSA. BI does not derive a bank assessment rating. BI provides the report of examination to the FSA within one month of the examination's completion. • The Indonesian Deposit Insurance Corporation (IDIC) can perform on-site examinations of banks in line with its function, tasks, and authority by coordinating first with the FSA.
Problem bank	The FSA informs IDIC about problem banks. If the FSA identifies that a bank faces liquidity problems or its condition worsens, the FSA will immediately inform BI to take the necessary steps according to BI's authority.
Information sharing	The FSA, BI, and IDIC must develop and maintain an integrated information-sharing mechanism.
Crisis management protocols	The ministry of finance, BI, the FSA, IDIC, and Financial System Stability Forum (FSSF) develop crisis management protocol, at both the institutional and national levels, to prevent and resolve crises.
Financial System Stability Forum	<ul style="list-style-type: none"> • The FSSF was established to maintain financial system stability. • The forum consists of the finance minister as coordinator, the governor of BI, the head commissioner of the FSA, the head commissioner of IDIC; and is facilitated by a secretariat. • Decision making in the FSSF is based on consensus. If a consensus is not obtained, the decision is made based on majority vote. • During normal conditions, FSSF will monitor and evaluate financial system stability, meet at least once every three months, make policy recommendations for maintaining financial system stability, and exchange information. • To prevent and resolve crises during abnormal conditions, if any of the FSSF members identifies a potential for crisis or an actual crisis in the financial system, that member can call for a meeting of the FSSF to determine steps for crisis prevention and resolution. • Each of the FSSF members is authorized to make decisions on behalf of and for the institution he or she represents in the FSSF during abnormal conditions. • The FSSF determines and executes policy required to prevent and resolve a financial crisis in line with its authority. • The decision of the FSSF related to the settlement and resolution of a failed bank identified as posing systemic risk binds the IDIC. • FSSF policy related to state finances must be proposed to parliament for approval. A parliamentary decision must be made within 24 hours from when the proposed policy is accepted by parliament.

Source: Bank Indonesia.

Table 3.9. Post-Global Crisis Macroprudential Policy Measures

Issue or Trigger	Measure	Objectives
The high and increasing demand for BI certificates (SBI) and volatility in demand is vulnerable to external shock. This condition could pressure exchange rate stability and output in the long run.	Minimum holding period on SBI of one month beginning in July 2010, and increased to six months in 2011.	To put “sand in the wheels” of short-term and speculative capital inflows, as well as to mitigate the risk of sudden reversals.
The increasing volume and trend of short-term portfolio holdings (largely offshore), including for SBI, which could pressure exchange rate stability.	<p>Lengthen the time between auctions (from weekly to monthly) and offer longer maturities (3, 6, and 9 months) for SBI, as of June 2010.</p> <p>Shifting SBI to term deposits as of July 2010, because these bills are a nonmarketable securities instruments.</p>	<p>To enhance the effectiveness of liquidity management and to mitigate risk from capital inflows, by locking up funds to longer terms and encouraging the development of financial markets.</p> <ul style="list-style-type: none"> • To lock up domestic liquidity to longer terms and limit the supply of SBI in the market. • To facilitate longer-term investment of offshore portfolios through the banking system.
The increasing volume and trend of offshore borrowing, especially in the short term. This condition triggers volatility of capital inflows, especially through the banking system.	Reinstate limits on short-term offshore bank borrowing from 20 percent to 30 percent of a bank’s capital.	<ul style="list-style-type: none"> • To limit short-term and volatile capital inflows. • To limit foreign exchange exposure of the banking system stemming from capital inflows.
Relatively low foreign exchange reserve requirements of banks is not sufficient to mitigate shocks in capital inflows. In addition, idle foreign exchange liquid assets could trigger volatility of the exchange rate.	Increase foreign exchange reserve requirements of banks from 1 percent to 5 percent on March 2011 and to 8 percent on June 2011.	<ul style="list-style-type: none"> • To strengthen foreign exchange liquidity management and thereby the resilience of the banking system in confronting increasing foreign exchange exposure emanating from capital inflows. • To help absorb excess domestic liquidity.
Excess liquidity in the banking system and relatively slow lending growth reflected by a low LDR. Banks tend to invest a large part of their portfolios in liquid and low-risk assets (SBI and government bonds).	<p>Increase rupiah primary RR from 5 percent to 8 percent in November 2010.</p> <p>This measure was complemented with a minimum LDR for banks. Banks with LDR of 78 to 100 percent are not obliged to increase their RR ratio, as of March 2011.</p>	To absorb domestic liquidity and enhance liquidity management by banks without exerting a negative impact on lending required to stimulate growth.

Source: Modified from Alamsyah, 2011.

Note: LDR = loan-to-deposit ratio; RR = reserve requirement; SBI = Sertifikat Bank Indonesia, or Bank Indonesia certificate.

The Indonesian economy faces a number of challenges, including rising inflation, rapid inflows of foreign capital, sizable excess liquidity, and problems in the real sector. In line with the imbalances in the recovery of the global economy, foreign capital continued to flow into the country during 2010. Regardless, inflation was well under control.

Financial factors play a crucial role in the transmission of monetary policy through the corporate balance sheet channel, through bank balance sheets, and through the risk-taking behavior of banks and firms (Satria and Juhro, 2011; Agung 2010). However, amid the sizable excess liquidity, the role of banks in promoting economic growth was still limited. In addition, Indonesian banks are less competitive as measured by efficiency, capital, and assets compared with their regional peers.

These challenges complicated monetary policy and BI faced a trilemma between exchange rate stability, price stability, and financial system stability. BI cannot rely on one policy, but should use a policy mix to maintain a balanced economy, both internally and externally. Monetary and macroprudential policy should be integrated to ensure macroeconomic stability. To achieve an internal balance, interest rate policy should be used in conjunction with macroprudential policy. Meanwhile, to achieve external balance, exchange rate policy and macroprudential policy covering foreign capital flows should be integrated. Macroprudential policy has been adopted to overcome short-term capital flows, manage liquidity in the domestic economy, and mitigate the risk of instability in the financial system.

Policy coordination is also essential. Policy coordination with the fiscal authority as well as with other sectors is crucial, considering that inflation stemming from the supply side creates the majority of inflation volatility. Coordination between monetary policy and macroprudential policy, as well as microprudential policy, will become more important and more challenging following the transfer of banking supervision from BI to the new FSA in January 2014. In addition, an effective communication strategy is also important for the implementation of both monetary and macroprudential policies.

Sri Lanka's Experience

KUMUDHINI SARAVANAMUTTU

Sri Lanka's financial system is relatively small, with financial institution assets roughly equivalent to 120 percent of GDP in 2011. The financial system is dominated by the banking sector, which accounts for about 60 percent of

financial system assets. The credit-to-GDP ratio in Sri Lanka is low at about 40 percent. The capital market is underdeveloped, with the stock market equivalent to 35 percent of GDP.

The mandate for maintaining financial system stability has been given to the Central Bank of Sri Lanka (CBSL) by law, and it is one of the core objectives of the CBSL, along with economic and price stability. The Financial System Stability Committee (FSSC), an internal committee of the CBSL, is chaired by the deputy governor in charge of financial system stability. The FSSC monitors the buildup of vulnerabilities emanating from different sources, monitors systemic risk, and makes policy recommendations. There is also a Monetary Policy Committee chaired by the deputy governor in charge of price stability. The membership of the FSSC is wide and includes members of the Monetary Policy Committee to ensure that macroprudential policy and monetary policy complement each other.

Regulatory responsibilities are divided among multiple institutions. The CBSL regulates banks, finance companies, and the payment system. The Securities and Exchange Commission (SEC) regulates the listed equity and securities market and the Insurance Board (IB) regulates the insurance sector. The deputy governor of the CBSL in charge of financial system stability is on the board of the SEC and the IB. Coordination among regulators is facilitated by the Inter-Regulatory Institutions Council, chaired by the governor of the CBSL, and comprises all financial regulators and quasi-regulators.

With regard to the regulation of banks, Sri Lanka migrated to Basle II in 2009 under the simpler approaches for Pillar I. At present, work is under way to implement Pillar II, Supervisory Review.

Macroprudential Regulation in Sri Lanka

Macroprudential policy is defined as the use of primarily prudential tools to limit system-wide financial risk and to prevent disruption of key financial services and the economy. The role of macroprudential policy is to curb excessive risk taking by the domestic financial system. However, macroprudential policy is not sufficient to maintain financial stability; both monetary policy and fiscal policy need to play an active role.

The analytical framework for identifying and reducing systemic risk seeks to cover both the time and cross-sectional dimensions. The former deals with risks caused by credit cycles and the procyclicality of the financial system, whereas the latter deals with that result from interlinkages and common exposures between financial institutions. Macroprudential policy has been primarily applied to banks, and in some cases to finance companies, in Sri Lanka.

Time Dimension of Systemic Risk

A number of countercyclical policies have been implemented to dampen excessive credit expansion:

- *General provisioning requirement.* During a period of high credit growth, a general provisioning requirement applies to all advances extended by banks. The general provision of 1 percent was imposed in 2006, and was subsequently lowered to 0.5 percent in 2009 as credit growth waned.
- *Time-varying capital requirements (enhanced risk weights).* The risk weight for capital adequacy for retail loans provided by banks was increased from 100 percent to 120 percent in 2006.
- *Time-varying limits on margin trading requirements.* During the stock market boom, a credit limit on margin trading facilities granted for stock market transactions of 5 percent of total loans of banks was introduced in 2010. This was removed in 2012.
- *Ceiling on credit growth.* In response to bank credit growth of greater than 30 percent in 2010 and 2011, a limit of 18 percent credit growth was imposed on banks for 2012. This measure was mainly aimed at reducing the trade deficit.
- *Limits on net open position.* Limits on net open positions in foreign exchange of banks were reduced in 2011 to limit speculative trading in forward transactions.
- *Statutory cash reserve ratio.* All banks are required to maintain a cash ratio of 5 percent on rupee deposits.
- *Statutory liquid asset ratio.* Since 1989, all banks have been required to maintain liquid assets of not less than 20 percent of total deposit liabilities.

Cross-Sectional Dimension of Systemic Risk

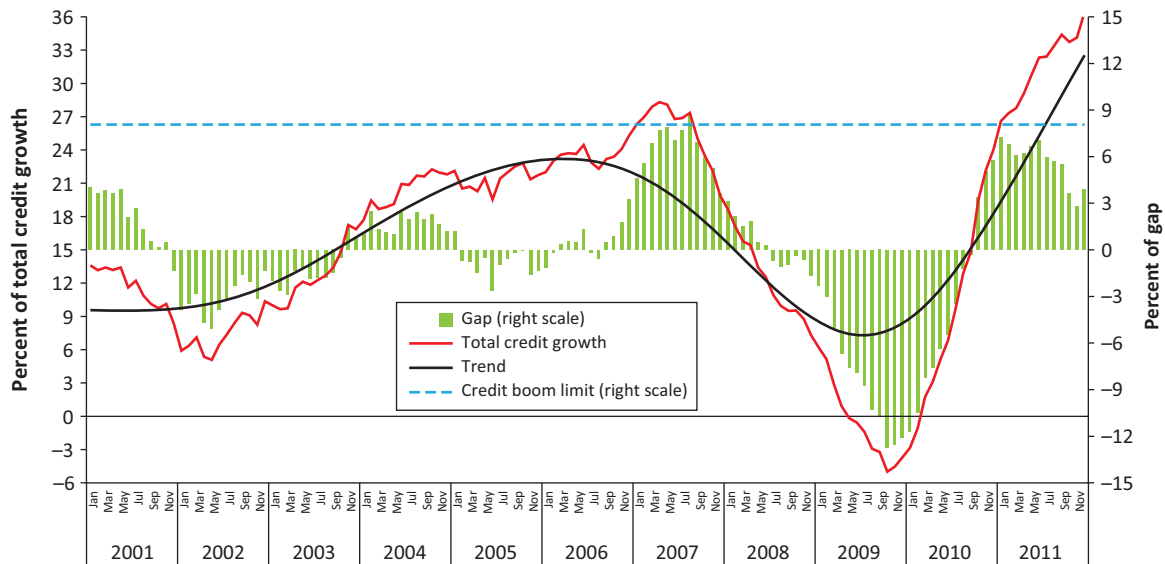
Policies to contain large exposures have been implemented.

- *Single and group exposure limits.* A limit of 30 percent of capital funds has been imposed on single and group borrowers, including financial firms.

Systemic Risk Assessment Tools and Indicators

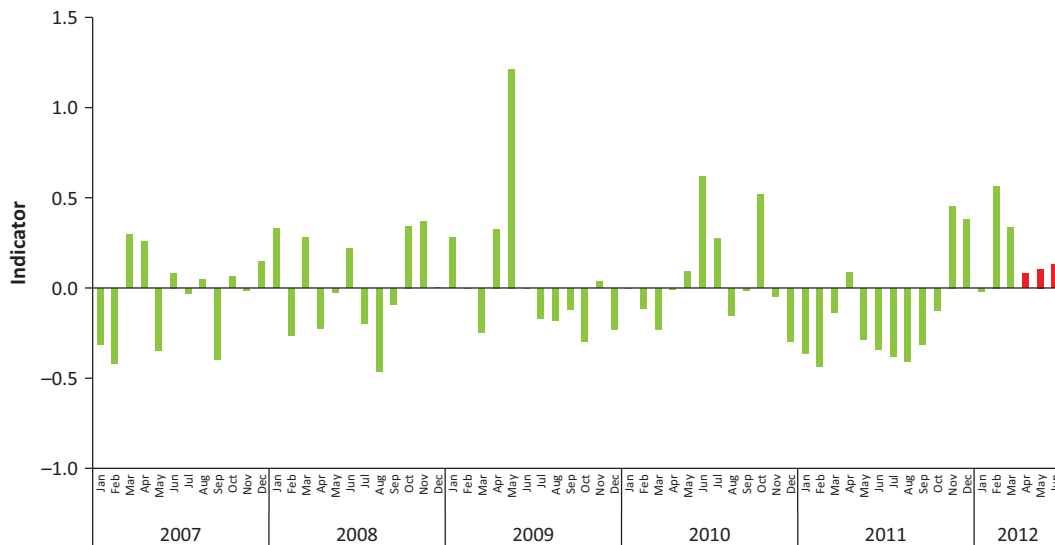
- *Monitoring of cyclical trends in credit growth.* Cyclical trends in private sector credit growth are monitored (Figure 3.23) to ascertain if a credit boom

Figure 3.23. Sri Lanka: Cyclical Trends in Private Sector Credit Growth



Source: Central Bank of Sri Lanka.

Figure 3.24. Sri Lanka: Financial Stress Indicator

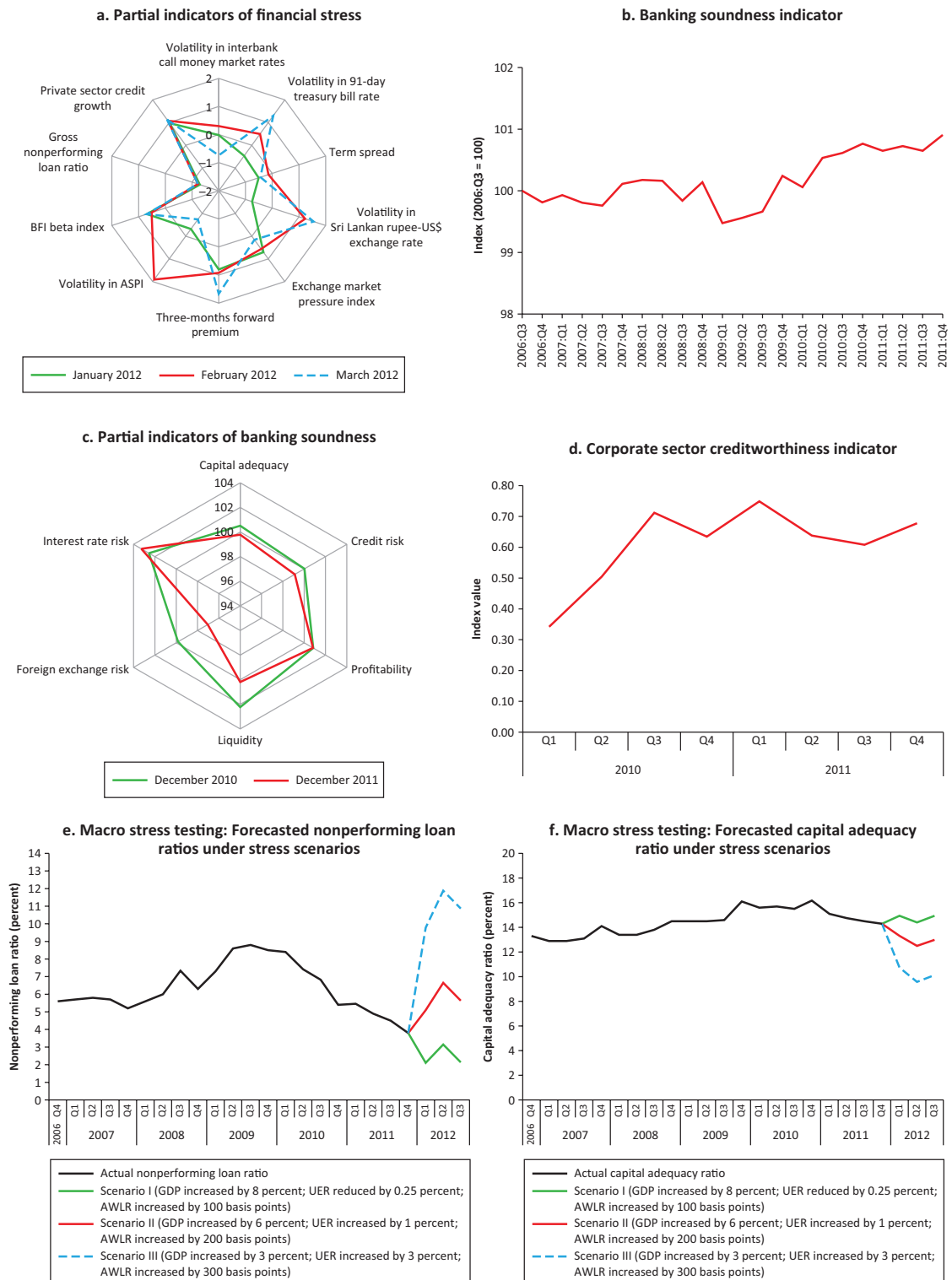


Source: Central Bank of Sri Lanka.

is being experienced, based on the methodology used by Mendoza and Terrones (2008).

- *Financial stress indicator.* A composite indicator of the stress levels in domestic financial markets and the banking sector. The variables include volatility of interbank call money rates; volatility of 91-day treasury bill yield rates; term spreads between 91-day treasury bill and five-year

Figure 3.25. Sri Lanka: Macroprudential Indicators



Source: Central Bank of Sri Lanka.

Note: ASPI = all shore price index; AWLR = average weighted lending rate (percent); BFI = finance and insurance sector (beta index); UER = unemployment rate.

treasury bond yield rates; volatility of the exchange rate; three-month forward exchange rate premium; Exchange Market Pressure Index; volatility of the All Share Price Index; beta index of the banks, finance, and insurance sub-index and the overall stock market index; gross nonperforming loan ratio of the banking sector; and private sector credit growth (Figure 3.24).

- *Banking soundness indicator.* An aggregate indicator of the soundness and stability of the banking sector, based on the CAELS (capital, asset quality, earnings, liquidity, and sensitivity to market risk) methodology. The variables included capital adequacy ratios, nonperforming loan ratios, profitability ratios, liquidity ratios, and interest rate and foreign exchange risk ratios (Figure 3.25, panels b and c).
- *Corporate creditworthiness indicator.* Monitors the debt-paying capacity of listed companies. The variables include leverage, profitability, and liquidity ratios (Figure 3.25 panel d).
- *Financial stability indicator.* This indicator is under development. It will be an aggregate of a macroeconomic stability indicator, financial markets stability indicator, and a banking soundness indicator.
- *Stress testing.* Stress testing of banks is done periodically, using the FSAP methodology (sensitivity analysis). This covers credit risk, market risk, and liquidity risk. In addition, a simple credit risk model is used to assess the impact of macroeconomic variables on the asset quality of banks (Figure 3.25, panels e and f).
- *Network analysis.* To assess interbank bank and financial institution exposures. This is under development.

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Macroprudential Frameworks in Asia

