

CENTRAL BANK POLICY MIX:

ISSUES, CHALLENGES, AND POLICY RESPONSES

HANDBOOK OF CENTRAL BANKING STUDY



EDITORS:

PERRY WARJIYO

SOLIKIN M. JUHRO

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THE GOVERNOR REMARKS

Talking about the central bank policy mix, my memory goes back to what happened a decade ago upon return from my terms as Executive Director at the Fund, when I first initiated the development of central policy strategy, called the central bank policy mix, for Indonesia in 2010,. These periods coincide with the episode of global financial crisis of 2008/09 (GFC) and its aftermath. A new central bank paradigm emerged where mandate of central banks cannot merely be confined to achieving price stability, but augmented with promoting financial system stability. To achieve this dual mandate, there is a necessity for central bank to formulate and implement a policy mix of interest rate policy, combined with exchange rate policy, capital flow management as well as macroprudential policy.

Our experience in Indonesia since 2010 has shown that implementing a central bank policy mix is superior rather than focusing on a specific policy to drive the economy. Prior to GFC, the world economy was preceded by two decades of monetary stability attributed with declining inflation and low interest rates. However, these macroeconomic condition contributed to the financial cycle pro-cyclicality indicated by housing and asset price bubbles, extensive credit expansion domestically and externally, accompanied by risk-taking behaviors. In turn, creating financial system instability problem. Thus, the central bank should assess not only the macroeconomic and risk outlooks but also detecting macro-financial imbalances in the financial system. Monetary policy responses still needs to be directed towards achieving price stability taking into account the financial instability and risk outlook looking ahead, supported with macroprudential policy and capital flow management. Beyond the central bank, policy mix is extended by strengthening coordination with the government and related agencies to ensure financial system stability and support overall macroeconomic stability and structural reforms of the nation.

These new paradigm of central banking are conceptually coherent and implementable, reflected by increasing trend of adoption by various central banks around the world. Strengthening central bank's institutional capacity on the subject of policy mix is important and becoming a necessity. With Indonesia's extensive experience during post GFC era including the episode of taper tantrum, Bank Indonesia have been on the front line to promote and share the evolution of policy mix through international flagship program, in terms of workshops and seminars since 2015. I am very grateful that the crystallization of my thoughts can eventually be internalized in productive activities and is contained in this book.

In closing, I would like to acknowledge and appreciate our partners in developing and executing this program over the course of five years. I hope this book is able to capture the dynamics of the program, as well as enriching for the general readers on the new dimension of central banking which will continuously evolved as we strengthen the policy mix frameworks and its supporting digital infrastructures. May our efforts leave a legacy that lasts for a brighter future.

Jakarta, July 2020

Governor of Bank Indonesia
Perry Warjiyo

FOREWORD FROM DEPUTY GOVERNOR

The phrase ‘policy mix’ emerged in the 1960s by Nobel laureate Robert Mundell, referring to a focus on the interactions and interdependencies between different policies and instruments as they affect the extent to which intended policy outcomes are achieved. Nonetheless, the meaning of the term remains ambiguous and the effect might be undermined up until the global financial crisis (GFC) in 2007-2008. GFC provided a lesson for monetary authority to put more emphasis on the importance of the financial sector to macroeconomic stability. GFC also raises awareness for fiscal authority to take supporting measures to restore economic stability. The rapid change of globalization factors will force economic policies to evolve continuously to address various economic challenges which cannot be addressed solely by monetary, macroprudential, or fiscal policies but requiring a mix between those policies and other supporting policies.

The emphasis of policy mix is how to have a well-measured approach to address relevant issues in timely manners. It is becoming more relevant now as global society are preparing for a new norm with the emergence of the digital economy and the advancement of technological progress, accelerated by the current ongoing pandemic. These state of the world fully embodied the terminology of TUNA (turbulence, uncertainty, novelty and ambiguity), accentuated by hyper-connectedness, higher degree of openness and wider and faster contagious spillover effects within country and region.

Bank Indonesia initiative to organize international workshop and seminar on these subjects since 2015 were in line with the competency development needs of fellow central bankers around the world, especially in the emerging markets. These program are co-hosted with various leading and prominent institutions and served as a platform for discussions between policy makers, central bankers, and academia. I believe such collaboration will support the knowledge advancement on the subject of policy mix and

essential for the anticipation of future challenges in our effort to safeguard and ensure long-term economic stability and prosperity.

May God Almighty bless us and enlighten our steps towards a better future.

Jakarta, July 2020

Deputy Governor of Bank Indonesia
Dody Budi Waluyo

ACKNOWLEDGEMENT

As part of Bank Indonesia's transformation journey, in 2015 the BI Institute was formed as the learning and research centre of Bank Indonesia. BI Institute vision is to become a prominent world-class institution of learning, study and research that strategically contributes to fostering the quality and dignified human resources and capable of realizing a prosperous and just nation. Our international flagship workshop and seminar reflects these vision and have an important role in facilitating discussion and collaboration on various current strategic issues with participation coming from domestic and international stakeholders. The “Central Bank Policy Mix: Issues, Challenges and Policy Responses” is our annual flagship program designed to examine the interactions among central bank policies including monetary policy, exchange rate policy, macroprudential policy, and capital flow management. It also elaborates modeling issues and quantitative analysis of the interaction among macoeconomic variables and policy instruments.

The program was first held in 2015 in collaboration with European Central Bank (ECB). Over the years, we have been working with various prominent institutions such as the International Monetary Funds – Singapore Regional Training Institute (IMF-STI), the Central Bank of the Republic of Turkey (CBRT) and others. Special mention goes to CBRT for regularly conducting a joint workshop program on these subject in Turkey. Our target audience for these programs are mid-to-senior level officials working in macroeconomics sector, financial sector and fiscal sector from the central bank and other public institutions.

On this occasion, we would like to acknowledge the continued support and strong leadership from the Board of Governors of Bank Indonesia which enabled us to implement our flagship programs on policy mix. I would also express my sincere gratitude to IMF-STI for a prolonged and wonderful collaboration, the distinguished speakers for their willingness to share

expertise and knowledge, and all alumni for actively participating in the programs. Going forward, we really hope that this program will strategically contribute to knowledge-based enhancement in the functioning of our role as central bankers and the public institution policy makers. Last but not least, we wish to extend our highest appreciation to various parties who have contributed to the completion of this book. We hope this book may further enhance the reader's understanding on the subject of policy mix.

Jakarta, July 2020

Head of Bank Indonesia Institute
Solikin M. Juhro

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NEW PARADIGM OF CENTRAL BANK POLICY MIX

1. Central Bank Policy Mix: Key Concepts and Indonesia's Experience

Perry Warjiyo

Introduction

It is my pleasure to deliver the keynote address for this important workshop. After serving my term as executive director of the Funds, in 2010 I initiated the development of what is now termed the central bank policy mix in Indonesia. This period coincides with the aftermath of global financial crisis 2007-2009, which marks a fundamental change in the mandate and function of the central bank. The mandate of central banks cannot merely be confined to achieving price stability, but and should be enlarged with promoting financial system stability. To achieve this dual mandate, it is advisable for the central bank to formulate and implement a policy mix of interest rate policy, combined with exchange rate policy, capital flow management as well as macroprudential policy. Policy mix should also be complemented with strong coordination and communication. Our experience in Indonesia since 2010 has shown that implementing a central bank policy mix is superior rather than only applying a certain framework such as Inflation Targeting Framework (ITF), as we have done in the past. In addition, the central bank also needs to be ready with the challenge and opportunity from the rising of digitalization. When we are facing unbundling of financial services through fintech and e-commerce, the central banks need to understand and response properly. The fundamental idea is that monetary policy and financial system stability policy can still be utilized to address the digitalization in the financial services, including in the payment system. I believe, integrating economic and financial in the era of digitalisation end-to-end process is the key success of any central bank that not only want to survive in the digital era but also to reap the benefits from the rapid

development of digital economy and finance. These are the new central bank paradigms.

What Has The Global Financial Crisis (GFC) Taught Us?

Let me first discuss what the global financial crisis (GFC) taught us, especially on the issue of enlarging the central bank's mandate. As we all know, prior to the GFC, the global macroeconomic condition was relatively stable. Inflation and interest rate were declining for the last two decades before the crisis. This development, among others, is due to the increasing number of central banks adopting monetary policy framework, which focus on maintaining price stability, known at that time as the inflation targeting framework. In the US, the period prior to the GFC was known as the Great Moderation. Sustained monetary stability, however, occasionally created another problem of financial system instability. This reminds us of what Hyman Minsky alluded to in 1982, namely the financial instability hypothesis (Minsky, 1982). Under an economy where capital is the backbone of the economy, low inflation and low interest rates during a period of economic boom create the booms and busts of the financial cycle. This leads to financial cycle pro-cyclicality. During an economic boom, there are housing bubbles, asset price bubbles, credit expansion, an accumulation of external and domestic debt, and risk-taking behavior. This is what we have had in the past. Where there is economic stability, an economic boom, boom and bust in the financial cycle, pro-cyclicality and systemic risk create the problem of financial system instability. A lot of research has been done on that area, including what caused the global financial crisis. Various research has documented that boom and bust cycles during an economic crisis were usually preceded by pro-cyclicality and systemic risk, along with a housing bubble, credit boom and external debt as well as the influence of capital flows (Jordà, Schularick, and Taylor, 2010; Claessens, Kose, and Terrones, 2011; Claessens and Kose, 2013).

Against the backdrop of GFC, let me put forward three salient lessons for central banking. First, as I indicated earlier, the mandate of the central bank cannot be confined only to achieving price stability, it should be enlarged by also promoting financial stability. How does financial stability need to be incorporated into the monetary policy setting of the central bank? This reminds us of the debate between the lean versus clean approach to monetary policy (OECD and White, 2009). In the clean approach, central bank does not react to future financial system instability risk but letting the market to adjust by itself. During a crisis, the central bank will just clean up the mess. I think this approach was adopted by the US Federal Reserve under Chairman Greenspan. Bubbles may result from a declining risk premium and irrational exuberance, while rising interest rates could cause a bubble to burst more severely. The global financial crisis taught us, however, that it is better for monetary policy to lean against future financial instability and future financial cycle risk. On the other hand, the lean school of thought implies that interest rates also need to be formulated with regard to pro-cyclicality risk in the economy. A number of countries have shown success with this approach, for example Australia when addressing the housing bubble in 2002-2003. Chairman Bernanke back in 2009, in the Washington Post, also stated that the Fed plays a major role in arresting the financial crisis and should be seeking to preserve, not degrade, the institution's ability to foster financial stability and to promote economic recovery without inflation. This is the first lesson that we must draw from the global financial crisis. In addition to price stability, central banks need to also pay due regard to financial system stability.

Second, the global financial crisis also taught us the importance of the linkages between macro economy and financial system; or the macro-financial linkages as we know it today (Morley, 2016). It is important to understand the relation between financial cycle and systemic risk, the pro-cyclicality of the financial system and the systemic risk. Housing price

bubbles, asset price bubbles, and excessive external debt sometimes occur when the economy is accelerating (in a boom phase). The pro-cyclicality of the financial sector also has a higher amplitude than the economic cycle. During a boom period, there is usually excessive credit growth compared to the amount required by the economy along with external debt. Whereas during a crisis period, credit growth is far more constrained than what is required in the economy. This macro-financial linkage of the financial system through pro-cyclicality and systemic risk cannot be addressed only by monetary policy but also through micro-prudential regulation and supervision. Monetary policy can lean against the wind of financial instability but interest rates alone will not be sufficient. Low interest rates environment may cause a housing bubble, coupled with risk-taking behaviors and other factors. Micro-prudential policy which focused on the healthiness of individual banks and financial institutions, can also address these issues. For example, if we want to increase the risk-weighted measure of capital requirements that would be ineffective in terms of addressing a housing bubble because a risk evaluation of capital requirements is also pro-cyclical. Usually, the risk evaluation tends to underestimate the true risk during an economic recession. This nature of macro-financial linkages, through pro-cyclicality and systemic risk in the financial system, requires a new tool, a new measure and a new policy, which is now known as macroprudential regulation and supervision. This addresses pro-cyclicality and systemic risk in the financial system. Looking at the experiences of a number of countries, it is evident that a central bank is well-qualified to assume the macroprudential function from the point of view of surveillance capacity as well as the policy tools that the central bank has. Kawai and Morgan (2012), for example, also showed this. A study of 13 developed and emerging market economies by the Bank for International Settlements (BIS) in 2011 also concluded that the central bank must be involved in the formulation and execution of financial stability policy for such policy to be effective. The performance of the

monetary policy function provides the central bank with a macroeconomic focus as well as institutional capacity to enlarge their monetary policy framework with additional macroprudential measures and assessments of macro-financial linkages. When there are costs in the economy, the central bank will be the ultimate source of liquidity for the economy, especially through the lender of last resort (LOLR) function.

The third lesson from the global financial crisis is capital flow volatility (Hannan, 2017). This issue applies mostly from the perspective of emerging market economies (EME). Capital inflows were huge during the period following the GFC until the middle of 2013, namely the Fed's Taper Tantrum, due to unprecedented quantitative easing (QE) in advanced economies coupled with low interest rates. However, EME experienced sudden capital reversals following the Taper Tantrum in 2013. Currently capital flow volatility is still relatively high. EME needs to address this issue since capital flows volatility contributes to financial and macroeconomic instability in the economy (Baum, Pundit, and Ramayandi, 2017). Central banks can respond with interest rate policy or greater exchange rate flexibility, but we need to complement it with new measures and policies, known as capital flow management.

A Post-GFC Paradigm Of Central Bank Policy Mix

The three above-mentioned lessons have changed the mandate and function of the central bank. A central bank can no longer be confined to only achieving price stability, financial stability must also be incorporated. Central banks need to enlarge and complement the monetary policy framework with additional measures that lean against the wind in the form of macroprudential policy and capital flow management. This lesson leads us to the concept and key feature of the central bank policy mix and how this is being formulated and implemented through the central bank.

Let me begin the discussion of the concept and key features of the central bank policy mix. To achieve price stability and support financial stability, the central bank should assess not only the macroeconomic and risk outlooks but also enlarge the assessment to detect macro-financial imbalances in the financial system. This can be achieved by incorporating the financial sector and the external sector in the central bank's macroeconomic forecasting and analysis models. A number of models have been developed in the literature, including the model by Angelini, Neri, and Panetta, (2011.). This assessment of macro-financial linkages usually emerges in the form of pro-cyclicality and a build-up of systemic risk concerning housing and other asset price bubbles, credit booms, accumulation of external debt and capital flow volatility. Based on this macroeconomic and macro-financial imbalances assessment and outlook, the following three building block forms the central bank's policy mix. As I alluded to earlier, monetary policy still needs to be directed towards achieving price stability but taking into account the financial instability and risk outlook. This is important, namely how interest rate or monetary policies need to address the emergent of pro-cyclicality and systemic risk in the financial system, such as monetary and financial stability inter-linkages. The second building block is macroprudential policy and the third is capital flow management.

From the first building block, financial system stability can be incorporated into the monetary policy framework through the lean versus clean debate that I alluded to earlier. One of the approaches is to incorporate financial stability into the inflation targeting framework of monetary policy. Agenor and da Silva (2013) discussed what they called integrated inflation targeting framework that incorporated financial stability. They argued that in addition to the inflation and output gaps, monetary policy also needs to consider and react to credit gaps, namely the credit boom aspect as well as the real exchange rate in order to address the time-series dimension of systemic risk. In a paper written in 2012, Woodford also proposed an optimal

solution for monetary policy when the central bank formulates a trade-off between a greater degree of price stability and the output gap for the sake of stabilizing the financial system in terms of systemic risk (Woodford, 2012). Another paper written in 2014 also shows the kind of information needs to be included by incorporating financial stability in the inflation targeting framework, in particular the transmission mechanism of financial conditions, indicators of financial stability relating to the financial cycle, financial market vulnerabilities as well as early warning signals.

The second building block of the central bank policy mix is macroprudential policy, consisting of regulations and supervision concerning financial services institutions from a macro perspective with a focus on systemic risk, as required for promoting financial system stability. The macroprudential policy has both time dimension and cross-section aspects. The time dimension of macroprudential policy aims to mitigate financial cycle pro-cyclicality as well as credit booms and busts in the economy, while the cross-section aspect of macroprudential policy focuses on addressing and mitigating the risk of interconnectedness in the financial system network. These are the two dimensions of macroprudential policy, namely the time dimension of pro-cyclicality and the cross-section dimension of interconnectedness and systemic risk. Several policy instruments have been developed and practiced by the central banks. For example, macroprudential policy instruments to address pro-cyclicality includes the loan-to-value (LTV) ratio aims to manage the credit cycle and a countercyclical capital buffer (CCB) as well as limits on foreign exchange risk exposure and offshore borrowing to address the systemic risk. These are macroprudential policy instruments available for the central bank to implement in their policy mix.

The third building block is capital flow management, which aims to mitigate pro-cyclicality and the build-up of systemic risk from the accumulation of external debt as well as capital flow volatility. As documented in the International Monetary Fund (IMF) in 2012, 2013 and

2015, the best defend to address this is through macroeconomic policy, exchange-rate flexibility, financial market deepening, strengthening financial regulations and supervision, which is now known as the Institutional Approach to Capital Flow Management. Capital flow management complements monetary policy and exchange rate flexibility. A number of countries have already implemented this, including a tax on equity portfolio and debt inflows in Brazil in 2009, for example. In Indonesia, we implemented a holding period on central bank bills and limits on short-term foreign borrowing in 2010-2011. South Korea implemented a withholding tax on interest income and non-resident purchases of treasury and monetary stabilization bonds in 2011. Also, Thailand implemented a withholding tax on non-resident interest earnings and capital gains on new purchases of state bonds in 2010. There are a number of measures associated with capital flow management.

Conceptually, the central bank policy mix is coherent and can be implemented. Indeed, a number of central banks, including Bank Indonesia, have already implemented a central bank policy mix, which is becoming a new paradigm of central banking.

Bank Indonesia's Policy Mix

I would like to share with you some of Indonesia's experiences in terms of formulating and implementing the central bank policy mix. To support the formulation of a central bank policy mix and to enrich our better understanding of the macro-financial linkages, we have already enlarged our macroeconomic forecasting and analysis models to include macro-financial linkages. This includes external default risk as a proxy of a sudden stop capital reversal as well as credit gaps to incorporate financial system procyclicality and has already been published in the papers (Harmanta, et al., 2012; Harmanta, et al., 2013). Even now, we have completed our DSGE

model, which incorporates macro-financial linkages in the forecasting and analysis models. This is important for our policy formulation process.

The model provides policy scenarios with the basic inflation targeting framework through the interest rate response under the Taylor rule as well as a mix of reserve requirements from monetary policy and our loan-to-value (LTV) ratio as macroprudential policy instruments. The model already includes the macro-financial linkages and the instruments in the central bank policy mix include the interest rate response a la Taylor rule, exchange rate flexibility, reserve requirements and the loan-to-value (LTV) ratio to address credit cycle booms and busts. This is the model that we have already developed, which plays an important role underlying our policymaking. The central forecasting model is forward-looking, it sets important considerations on how best to lean against the possible risk from sudden stop capital flows and the build-up of pro-cyclicality and systemic risk in the financial system; whether we only need to address through interest rates alone, or complemented with exchange rate flexibility as well as other macroprudential measures, for example reserve requirements and the loan-to-value (LTV) ratio.

To strengthen our understanding of pro-cyclicality of macro-financial cycles, credit booms and housing bubbles in particular, we also run a separate model to assess the nature of their cycle and possible build-up of systemic risk both at an aggregate level and cross-section. A paper published by Alamsyah and Harun also supports our policymaking (Alamsyah, et al., 2014; Harun, et al., 2014). This provides a good approach and framework for our central bank policy mix, consisting of the following four main instruments. First, as with the inflation targeting framework, interest rate policy is being formulated to ensure the inflation forecast falls within the targeted range. Second, the exchange rate policy is geared towards maintaining the stability of exchange rate movements along its fundamental trend to ensure consistency with achieving the inflation target as well as to mitigate excessive

volatility that may put pressure on financial stability. Third, capital flow management is conducted to support exchange rate policy, particularly during periods of large surges of capital flows and heightened risk of capital reversal. Fourth, macroprudential policy is geared towards maintaining financial stability and supporting the effectiveness of monetary policy transmission. Policy mix effectiveness are also supported by financial market deepening, policy coordination and communication. Further, the central bank also maintain close coordination with the government through the Ministry of Finance and other agencies in the form of a Financial System Stability Committee, which consists of the Minister of Finance, Governor of the central bank, Chairman of the Indonesian Financial Services Authority and the Chairman of the Deposit Insurance Corporation (LPS). This is the framework of the central bank policy mix that Bank Indonesia has already implemented since 2010.

Let me share a brief overview of three episodes of policy mix implementation in Indonesia, considering what we have implemented, the implementation challenges as well as our central bank policymaking response since the global financial crisis. The first episode is during the period of 2010-2013. Back then, Indonesia was enjoying the benefits of conducive global economic and financial conditions. We experienced a commodity price boom and high economic growth, supported by commodity exports. This then created a housing price boom, while simultaneously accelerating credit growth. We also experienced huge capital inflows at that time, which added stimuli to the economy through liquidity injections, a credit boom and soaring house prices. This is when we introduced and started to implement a central bank policy mix because this was a challenge that we could not resolve only through interest rate policy. Low inflation environment provides the room for lowering the interest rate as we did cut our policy rate back then. However, lowering the interest rate further stimulated credit boom and housing boom. At that time, capital inflows were less sensitive to the interest

rate because of abundant global liquidity. Our interest rate response through FX intervention mitigated the further misalignment of the real exchange rate that had appreciated beyond the currency's fundamental value. These policies were complemented with capital flow management. We started to issue a holding period as well as limits on short-term offshore borrowing by banks. We also introduced the loan-to-value (LTV) ratio in the automotive and property sectors because both sectors were experiencing excessive credit growth above 30% (yoy). This was more effective than only resorting to the interest rate. A policy mix of interest rates, exchange rates, capital flow management and macroprudential policies has proven to be more effective.

The second episode was much more challenging, during the period of Taper Tantrum. This was the most challenging period confronted by central banks around the world. The Fed's Taper Tantrum triggered a huge capital reversal in a very short-term period, squeezing domestic liquidity, encouraging herding behavior in the FX market as well as triggering monetary and financial instability pressures. Domestically, we still had housing and credit booms. Back then, credit growth was still relatively high at around 27% (yoy). The situation getting more complicated, as we started to experience a current account deficit, as a result of declining international commodity prices coupled with persistently strong domestic demand. At the same time, there was uncertainty concerning government energy price policy.

The complexity of maintaining internal balance and external balance could not only be resolved through the standard inflation targeting framework and interest rate policy. Bank Indonesia was the first central bank reacting to the Fed's Taper Tantrum through an interest rate policy response. Bank Indonesia increased its policy rate aggressively, totaling 175 basis points within six months. We still based our central bank policy mix on the inflation targeting framework by responding through interest rate policy. However, we needed to complement that policy mix with other policy instruments. Thus, we also intervened in the FX market through dual intervention policy

to maintain exchange rate stability. For Indonesia, most of the exchange rate pressures originated from external shocks in the form of a global reversal by investors from government bonds. Consequently, we complemented our FX intervention to stabilize the exchange rate with the purchase of government bonds from the secondary market. This dual tactic of intervention was more effective than just intervening in the FX market. We addressed the source of the risk, namely foreign investors flying from government bonds. To that end, we coordinated with the Ministry of Finance to make intervention more effective. We also relaxed our holding period from six months to one month and also expanded the scope of transactions excluded from the calculation of offshore borrowing in the banking industry with respect to capital flow management.

The complication still exist due to high bank lending growth which requires tightening the macroprudential measures. Although we relaxed the policy in terms of capital flows, we tightened our macroprudential measures in 2013, especially lending to the property sector, which was excessive at that time. Therefore, we tightened our loan-to-value (LTV) ratio for subsequent mortgage facilities. We also complemented this measure through supervisory actions for banks that were exhibiting excessive lending behavior. This was the central bank policy mix that we believed would be more effective than only relying on one instrument, namely an interest rate response. The bold monetary policy adjustment, coupled with close policy coordination with the Government and Indonesian Financial Services Authority, contributed to Indonesian resilience in the face of global financial shocks. Macroeconomic and financial system stability remained intact, as evidenced by low inflation and a narrower current account deficit from 3.3% of GDP to 2% of GDP. Consequently, economic moderation was less severe than if only one policy instrument had been used. Despite domestic economic moderation, growth remained relatively high compared with other emerging market economies. We have forecasted economic growth this year at around 5% and increasing

next year. The central bank policy mix in terms of maintaining macroeconomic, monetary and financial stability, successfully navigated the second episode of the economy.

Starting in 2015, we had the liberty to adjust our policy stance. As our risk forecast for prices and financial stability starting in 2013 was low, we started to adopt accommodative monetary policy in early 2015. Last year, we started to relax reserve requirements and macroprudential policy instruments because in 2015 we could not start with interest rates due to the uncertainty affecting the expected federal funds rate (FFR) hikes. Our policy stance came from the other instruments of the central bank policy mix. We lowered our reserve requirements by 50 basis points in November 2015 and by 100 basis points in February 2016. Lowering the reserve requirements was part of monetary easing. We also relaxed our loan-to-value (LTV) ratio by an average of 10% for lending to the property and automotive sectors in 2015. In August 2016, we relaxed our macroprudential policy on subsequent mortgage facilities.

With growing certainty concerning the future trajectory of the federal funds rate (FFR), we began to cut our policy rate this year. In 2016, we have cut our policy rate six times, totaling 150 basis points to 4.75% currently, accompanied by successful monetary operations reforms, moving our policy rate from the 12-month BI Rate to the BI 7-Day (Reverse) Repo Rate. Those were the three salient episodes when we formulated, designed and implemented the central bank policy mix. The building blocks of our central bank policy mix remained grounded in the inflation targeting framework but we enlarged our forecasting model to include macro-financial linkages, credit gaps as well as a capital reversal. We complemented this with research on the financial cycle, credit booms and busts as well as other aspects of financial imbalances. Bank Indonesia was also the first central bank amongst emerging market economies to develop a national balance sheet to address macro-financial risk. At that time, the central bank had more space and liberty to

optimize its instruments, namely the interest rate, exchange rate, capital flow management and macroprudential policy.

I hope I have been successful in presenting the key concepts as well as the implementation of central bank policy mix. Hopefully our country's experience contributes to the discussions in academia and central bank policymaking. Let me add two key takeaways before closing. First, strengthening the institutional capacity of the central bank is important to support the policy mix. In Bank Indonesia's case, we enlarged our policy forecasting and analysis models to encompass macro-financial linkages, research on the financial cycle, micro-financial linkages, as well as systemic risk and interconnectedness in the financial system, in addition to the risk of capital flows, private external debt and other aspects. The internal decision-making process has also been strengthened by introducing a joint committee. Over the past two years we have held a joint monetary policy and financial system committee meeting prior to the monthly board meeting, which was previously held separately. At the meeting, we discuss the macro-financial linkages and recommend an optimal policy mix. This has been very positive and has strengthened the policy mix. Second, closer coordination with the government and other related agencies is also being strengthened. In Indonesia's case, a new law established the Financial System Stability Committee to coordinates the regulations amongst the four agencies to ensure financial system stability and support overall macroeconomic stability. Coordination is also being strengthened in terms of the structural reforms. A mix of macroeconomic policies and structural reforms is very important. We hope that this strengthens the central bank policy mix to support sustainable economic growth with sound macroeconomic and financial stability.

What's Next: Dealing With Diminishing Globalisation And Rising Digitalization

Since the GFC until recent development, everything that we learned at the university are being challenged. We need to rethink the macroeconomic theory and practice. We need to think how the financial services operated and how to response, not just from the perspective of policy maker, but also academicians and researcher. The increasing and continuing trade tension we are facing leads to an era of diminishing globalisation and rising digitalisation. I will share my thoughts from the central bank perspective on how we as academicians and policy maker need to understand what is happening in the diminishing of globalisation and the rise of global digitalisation. I invite all participants to think about the economic underlying as well as the theory that we have to teach and research we conduct in order to advance our academic thinking and the appropriate policy response. In the first part, I will talk about the characteristics of diminishing globalisation and rising digitalisation. And in the second part I will discuss the central bank's response.

Let me start with the first part. So many characteristics and stylized facts that we can learn and research since the global financial crisis. The first characteristic is the rise of inward looking policy, anti global trade. We are currently still facing the trade war between US versus China and others. Previously, trade globalisation is perceived to be the component to actually promoting our global economic growth and increasing the capacity of the country to rise as well as where actually the adjustment in the global trade can be smoothed to the equilibrium. With the ongoing trade war, is there still any room for international trade to equilibrate the disequilibrium in the global economy? Global communities are discussing whether US economy will continue to grow. Some of the financial market analysts already forecasting US will probably be in the recession in 2021 if the trade war

continues. This is the issue where the trend of trade globalisation in the past is already diminishing. The next question is how the academic and policy maker may help to understand this phenomenon and how can we explain it to our students and researchers? The diminishing market mechanism in the global trade is the first characteristic.

The second characteristic is in the global financial sector. In the past, the interest rate parity and free of flow capital have become the engine to distribute saving-investment gap and promote economic growth. Interest rate parity can equilibrate the prices of capital flows. However, the volatility of capital flows has been increasing, especially since the taper tantrum. It is very difficult to understand the movement of capital flows solely from analysing the interest rate parity condition. Risk premium may help to explain the phenomenon, however we also aware that risk premium dynamics is similar to a random walk variable rather than following fundamental factors that can be explained by theory. Hence, we need to re-look the paradigm of free capital mobility as well as the interest rate parity theory, such as the Mundell-Fleming theory and the Dornbusch over-shooting model, in order to better understand the increased volatility of capital flows. Those kind of the things that we have to understand as the second characteristic.

The third characteristic is on the policy response. If we look at both in the advanced countries and the emerging countries, the policy responses are becoming less effective now. Advanced countries in the past formulate their monetary policy based on policy rules, such as the Taylor rule, Yellen rule or other rules, especially in the context of inflation targeting framework. However, when the interest rate is near or zero, the inflation targeting framework becomes less effective. Recently, we witness the implementation of unconventional monetary policy namely the quantitative easing (QE). In the past, we have learned that if we use interest rate channel then the quantity channel will adjust. But now we cannot only rely on interest rate policy for monetary policy response. We have to combine the interest rate

policy with the quantitative policy, whereby in the past we learned and also taught student that this is not the proper way. This is the third characteristic.

The fourth characteristic is digitalisation. There are so many digitalisation, but I just want to talk about the digitalisation in the financial services. In the past financial services are being provided in one room by the banks and financial institutions, through deposit, lending or financing, and assets management services. Those financial services are becoming unbundled by digitalisation with the rise of fintech in the area of payment, crowd funding, peer-to-peer lending and assets management. Even in the financial market the trading is no longer conducted by people but by machine through artificial intelligent. How can the phenomenon of digital era such as of the unbundling of financial services, the use of the machine learning in trading, the transmission of monetary policy, the inter-relation function of financial services be explained from the conventional theory of financial services? Last but not least, how can we understand the central bank role on those aspects where we are facing with the emergence of digital currency such as libra and bitcoin.

In the second part, I will discuss the response from the central bank perspective. Central banks in the past are being taught to have a single objective of price stability and the use single instrument of interest rate. In Bank Indonesia's case, we had Bank Indonesia rule as opposed to the Taylor rule and Yellen rule. When I was an executive director in the IMF, representing 13 member countries in the region during 2007 and 2009, I witnessed the fall of financial services and monetary transmission mechanism globally. I also saw the fall, or at least the diminishing, of implementation of inflation targeting framework. I learned that the mandate of central bank cannot be only confined to price stability. Central bank must have a mandate of supporting financial stability because otherwise price stability cannot be achieved without financial stability thereby effective transmission as well as

financial stability cannot be achieved if we cannot maintain the stability of the price and assets price.

The mandate of central bank must have promoting financial stability in addition to price stability. On the monetary policy side, even we have to complement interest rate policy with some aspects of exchange rate stability, some aspects of also managing the quantitative of money in circulation. On the financial stability area, the importance of macroprudential policy is increasing. The role of macroprudential policy, by definition, is to promote financial stability into two aspects. Managing cross-section systemic risks as well as time dimension of systemic risks, what we call financial pro-cyclicality. Those aspects of macroprudential policy must be complemented by the standard of monetary policy for achieving the price stability.

This is what I call the central bank policy mix. IMF calls it integrated policy framework, BIS is now discussing how to merge the theory and practice of central bank policy, but Solikin and I already wrote a book on that area. The Indonesia version of the book was published three years ago. More recently, Emerald published the English version titled “Central Bank Policy: The Theory and Practice” (Warjiyo, P. and Solikin M. Juhro, 2019). This book represents accumulation of all our knowledge, my knowledge, and Solikin’s knowledge on the theory, empirics, and policies. Chapter thirteen, fourteen, and fifteen especially discuss the subject of central bank policy mix. Now is just the right time to apply the central bank policy mix, in the era of diminishing of globalisation and the rise of digitalization. This is the first aspect on the central bank policy mix.

The second aspect is the institutional setting of public policy mix in the central bank as well as on the public institutions. In the past each public institution is assigned one objective with one instrument; central bank with price stability and interest rate policy; fiscal authority with fiscal rule and fiscal sustainability; financial services authority responsible for financial stability with microprudential corporation supervision. There are ongoing

debate globally whether the independence of central bank is still valid. From my point of view, I believe those institutional setting are still valid. However, I emphasise the need of simultaneously coordinate the policy within a solid synergy. The independencies of central banks must be put together in the simultaneity through coordination with public institutions as each of the equation cannot work alone. This is the policy coordination and synergy that we adopt in Indonesia.

The third aspect is the era of rising digitalisation, which is very challenging as there are still a lot of things to uncover. When we are facing unbundling of financial services through fintech and e-commerce, the central banks need to understand and response properly. The fundamental thinking is that monetary policy and financial system stability policy can still be utilized to address the digitalization in the financial services, including in the payment system. This is why in 2019 we unveiled the first ever central bank policy response in the digitalisation of economic and financial services through the Indonesia Payment System Blueprint of 2025.

In this blueprint, we need to integrate economic and financial in the era of digitalisation end-to-end process. Similar with the process in money supply where we use paper money or account based, the money issued by central bank are transmitted to the bank and circulating to the fintech and real sector and return to the central bank at the end of the day. These whole aspect of money supply process still can be used as basic reference. The second aspect of our Indonesian Payment System Vision is making the digitalization of the banking as the core of the ecosystem. We opted not to let the unbundling of financial services to grow outside the core banking. We are still promoting the growth of the fintech, the crowd funding, the peer-to-peer-lending, and the payment system, but we try to interlink those fintech with digitalization of the banking to avoid shadow banking as experienced by other countries as it possess the risk to diminish the role of central bank and the financial services.

The fourth aspect is to find the balance between innovation versus stability and risk management, as well as know your customer and competitive policy. Last but not least, we have to deal with cross-border digitalisation of financial services to better manage capital flows and other aspect of financial services from global perspective. As an example, on August 17th 2019 we launched our Quick Response Indonesian Standard (QRIS) which aims to encourage transaction efficiency, accelerate financial inclusion, and advance Micro Small Medium Enterprises (MSMEs).

Understanding the digital economy and finance are very important and this is my new baby. The issues that I everyday try to understand with my knowledge of monetary, central bank, financial aspect in the digitalisation of economy and finance. It is a very fascinating time and hopefully I will have the luxury of time to write a book on central bank in the digital area.

Closing

With the above-mentioned exploration, I invite all professors and scholars to study, to explain the underlying theory, provide some empirical assesment, and provide some policy response so all of us, myself as governor, and other governors have a better understanding and a better response.

I do hope the next five days will be enriching and will prove to be a very fruitful and beneficial event, not only for me, but for all of us to learn new things, especially the participants, towards a new dimension of central banking. Once again, welcome to this prestigious forum. Thank you.

2. Central Bank Policy Mix: Issues, Challenges, and Policy Responses

Solikin M. Juhro

Introduction

I would like to welcome all the participants. Welcome to Jakarta, the capital city of the Republic of Indonesia. It is an honor for me to welcome you to the international workshop entitled “Central Bank Policy Mix: Issues, Challenges and Policy Responses”. I would like to deliver three issues that will anchor the next few days. First, I would like to explain why the BI Institute organized this workshop on the theme of the central bank policy mix. Second, the essence of central bank policy mix formulation, which represents the backbone of the future central bank policy strategy in facing the global uncertainties that are expected to heighten with the emergence of the new digital era. Third, the outcomes we expect to deliver from this international flagship program.

This event, created and hosted by the Bank Indonesia Institute of Bank Indonesia, in conjunction with the International Monetary Fund – Singapore Training Institute (IMF-STI), and supported by the Central Bank of the Republic of Turkey (CBRT) as well as the Reserve Bank of India (RBI), is the fifth event we have held with the same theme. The first event was held in 2015 in collaboration with the ECB but in the last four years we have been working with the IMF-STI. Our target audience for this course consists of mid- to senior-level officials working in macroeconomics, the financial sector and fiscal sector from the central bank and other public institutions. For Bank Indonesia, this course has been an integral part of our international flagship program. Every year, we have around 15 international flagship programs, in terms of workshops and seminars, including a research conference because we manage two international journals, namely the Bulletin of Monetary

Economics and Banking, indexed by Scopus, as well as the Journal of Islamic Economics and Banking. I invite you all to submit your research articles to our journals.

These events are co-hosted by various leading institutions as part of Bank Indonesia Institute's journey towards becoming a world-class learning and research institution. This year, we are holding 15 international workshops and seminars. This is our fifth flagship event this year with many more still to run. For sure, we can add many other strong visions to the long list of why collaboration on the knowledge advancement in this field through such workshops is essential for the preparation of anticipating future potential challenges, crises even, in order to ensure long-term economic stability and prosperity.

The key messages I will explore briefly in my remarks, with regard to the central bank policy mix, are based on important issues that need to be tackled by central banks and other public institutions in a well-measured approach. The world situation under global hyper-connectedness, a higher degree of openness and increasing speed of contagious spillover effects from country to country, and region to region, need the timely and relevant issues to be addressed. This is to become more relevant when we are dealing with the challenges ahead in managing the emergence of the digital economy and the advancement of technological progress. The global economy in the aftermath of the Global Financial Crisis in 2008/09 (GFC) was remarkable. It was the worst financial crisis since the Great Depression of the 1930s. The scope and severity of the crisis were global and exceptional and forced policymakers to take some unconventional policy measures. The financial crisis was unprecedented and the impact has been prolonged as the global economic landscape enters a new norm, with a lower growth trend and more volatile financial markets. Since then, volatility, uncertainty, complexity and ambiguity (VUCA) have re-emerged in the global economic discourse. Now, we are facing not only VUCA but also TUNA. After the situation escalated

through trade tensions and retaliatory actions between the US and several other countries, the geopolitical situation in some regions, and escalation of the capital flows from emerging markets globally, we are now familiar with the economic terminology TUNA (turbulence, uncertainty, novelty and ambiguity).

Financial Crisis And Central Bank Policy Challenges

The understanding of the sources of a crisis is very important as what happened to the Asian economy 1998 that was hampered by the Asian Financial Crisis of 1997/98 and the global economy that was melted by the GFC. The crises and their aftermath have been painful reminders of the multifaceted nature of crises, either a currency crisis, debt crisis or banking crisis. We have also learned from the latest financial crisis that favorable global economic conditions, such as the Great Moderation during the period of decreasing macroeconomic volatility, as experienced in the United States and other advanced economies, could alert policymakers to misleadingly follow pro-cyclical economic and financial policies. We saw that in the early 1990s, even the Great Moderation could not guarantee that the global economy could be isolated from the crisis because in 2008 we saw that the authorities lack of identifying the sources of crisis, stemming from the vulnerability to the financial crisis, led to the global financial crisis and the prolonged impact that we are feeling to this day.

The global crisis showed that maintaining price stability without maintaining financial system stability is not enough to achieve macroeconomic stability. There is no macro stability without financial stability. The dynamics of capital flows quickly affect the effectiveness of monetary policy, therefore the monetary authority must use a variety of instruments, hence developing from a normal situation where the central bank respond to inflation and the fiscal authorities respond to finance public expenditures. In the aftermath of the GFC, the conventional economic policies

were considered no longer sufficient in terms of stabilizing the domestic economy. Several central banks being aware of the condition that new global economic conjuncture necessitates a modification in the existing policy framework by enhancing other policies, such as macroprudential policy, exchange rate policy, capital flow management, fiscal policy coordination and structural adjustments. This is now referred to as the policy mix (Warjiyo and Juhro, 2016 & 2019). Of course, from an academic point of view, we acknowledge that there have been some thoughts about various formats of ITF implementation, from standard ITF to flexible ITF and integrated ITF, which underlie this policy mix format. This approach is basically preserving the main objective of achieving and maintaining price stability, while safeguarding financial stability as the supporting or secondary objective.

With the emergence of widespread global uncertainty, the primary goal of monetary policy is to strike the right balance between mitigating the downward pressures on domestic economic growth arising from the global economic downturn, while ensuring stability in the medium-term. As central bankers, almost all of us well understand of the nature of the Mundell-Fleming: Impossible Trinity concept based on seminal works of Mundell in 1968 (Fleming, 1962; Mundell, 1963). The Policy Trilemma, where over time, the three goals cannot be attained simultaneously and only two out of three conditions can be applied together, is very well-known in the literature for a small open economy. The “Impossible Trinity” actually indicates that the dream of any central bank to have free capital mobility, stable exchange rates and independent monetary policy, which are hard to achieve in the “corner solutions”. Our speakers today will provide more details on these issues.

We are living in an imperfect world, so greater domestic economic integration with the global economy, coupled with intense foreign capital flows and exchange rate dynamics, has increased the complexity of monetary management. To confront these issues, the choice of monetary policy strategy has become how to transform the impossible trinity into a possible trinity.

The concept of a possible trinity can be expressed as an intermediate solution for a small open economy, including Indonesia that avoids volatile swings in the exchange rate, controls excessive short-term capital inflows and reinforces autonomous monetary policy. In this regard, for the case of Indonesia, to manage the monetary stability framework is indeed to manage the monetary policy trilemma, namely simultaneously achieving the three intermediate goals depending on the central bank's preference in terms of three conditions (Juhro, 2015; Juhro and Goeltom, 2015).

First, maintaining monetary policy autonomy in achieving price stability by utilizing a monetary and macroprudential policy (instrument) mix. Under standard ITF, we assume a flexible exchange rate regime but the underlying assumption does not hold mostly, for instance uncovered interest parity and the domination of imprudent foreign borrowing in domestic debt. The fact that exchange rate movements are mostly driven by market perception rather than demand and supply, we cannot rely on the free exchange rate assumption. That is why, under ITF, we cannot just rely on the interest rate as our instrument. To maintain monetary policy autonomy, we need another instrument from a macroprudential perspective.

The second condition is stabilizing exchange rate movements in line with the currency's fundamental value by employing exchange rate management. From Bank Indonesia's perspective, we have the perception that the exchange rate should be in line with its fundamental value. Therefore, if our balance of payments is performing well and our current account deficit is narrowing, we will automatically have a stronger exchange rate. In the short term, we have to smooth the volatility by engaging in a floating exchange rate regime. All central banks engage in some form of intervention.

Third, managing capital flow dynamics to support macroeconomic stability by implementing capital flow management. Our resource person in this program will hopefully explain about capital flow management, why we

cannot just open our economies. We have included capital flow management in terms of financial system stability as a temporary action not a permanent action. The coordinated implementation of a policy instrument mix is ultimately part of an important strategy to manage the monetary policy trilemma in the current climate blighted by high uncertainty. Coordination is critical, not only to address sources of external and internal imbalances, but also to optimally manage the impact of monetary policy, while avoiding overkill and mutual exclusivity. Within that policy perspective, the achievement of macroeconomic stability is not only tied to monetary stability (price stability) but also to financial system stability.

From ITF To Policy Mix

Under ITF-based monetary policy, which was formally adopted by Bank Indonesia in July 2005, the main priority of Bank Indonesia is to build central bank policy credibility. Therefore, it can only be expected that consistent commitment and determined implementation will be essential to the realization of a more credible ITF. Despite progress having been made since the crisis, the economy is still burdened by various constraints and problems. In this regard, the challenge in monetary policy is to contain rising inflationary pressures without impeding economic growth. We see that Indonesia is now growing at around 5% but we have grown by as much as 6.8% in the past. In the post-GFC and Asian financial crisis period, we are facing a new norm, with growth at around 5%. Under the new norm, 5% is very impressive, however, only below China and India. The question is whether or not a monetary policy framework aimed at achieving price stability is still relevant, such as ITF. The answer is a resounding “Yes”.

In his article, even Frederick Mishkin mentioned that crises do not undermine the basic principles of monetary policy, such as the importance of price stability, time consistency, independence and accountability of monetary policy and so on (Mishkin, 1999). These are not disrupted by a

crisis. We still need these assumptions in order to maintain ITF credibility. The fundamentals of ITF are not hampered by a crisis. We feel that ITF is still relevant. Although Bank Indonesia still sees ITF as a reliable monetary policy strategy for Indonesia, the framework needs to be enhanced by refining future ITF implementation strategy.

From a Bank Indonesia policy perspective, we see that ITF is still relevant but we need more flexibility in ITF implementation. Consequently, Bank Indonesia has enhanced ITF implementation under the unconventional wisdom of monetary policy, which later became the embryo of central bank policy mix (Juhro, 2015; Juhro and Goeltom, 2015; Warjiyo and Juhro, 2016 & 2019). There are five aspects of enhancement. First, continuing the adherence of the policy framework to an inflation target as the overriding objective of monetary policy. In this case, the main characteristics of ITF will remain, for example pre-emptive, independent, transparent and accountable policy implementation. Second, integrating monetary and macroprudential policy instruments. Appropriate monetary and macroprudential policy integration is required in order to buttress monetary and financial system stability. Third, managing the dynamics of capital flows and exchange rates. In supporting macroeconomic stability, coordinated implementation of a policy instrument mix must ultimately be part of an important strategy for optimally managing the monetary policy trilemma as I explained previously.

Two other aspects related to institutional strengthening, namely communication strategy and coordination. Communication strategy is not just for the sake of transparency and accountability. We regard good policy communication as an effective monetary policy instrument. There is a lot of evidence in Indonesia that when our central bank governor or members of the board of governors provide a strong and clear message to the market, it helps influence how market players behave and stabilizes the market. This reduces our intervention costs. Last aspect is strengthening Bank Indonesia and government policy coordination. Policy coordination is crucial, given

that inflation stemming from the supply side creates most inflation volatility. We are currently facing a flattening of the Phillips curve. This implies that the supply side is playing a more important role in terms of inflationary pressures. Therefore, we have to strengthen policy coordination in terms of monetary policy. Indeed, we have put strong synergy and coordination across a broader area through structural reforms in order to effectively balance between pro-stability and pro-growth strategies.

Therefore, under (enhanced) Flexible ITF, feasibility in policy mix implementation can be achieved through, amongst others, additional macroprudential instruments in addition to monetary instruments, which should reinforce one another. While monetary instruments will be utilized to influence monetary variables, such as interest rates, exchange rates, credit and expectations, macroprudential instruments will be utilized mainly to manage risk potential or perception in the financial markets. Fundamentally, the central bank policy mix represents the optimal integration of monetary policy, macroprudential policy and managing capital flows and exchange rates.

Now, we are moving to integrated ITF. The terminology has a broader scope than the flexible ITF proposed in several studies, such as Agenor and da Silva (2013). This represents the academic backbone of integrated ITF. Bank Indonesia has already crystalized these similar thoughts about the policy mix since 2010 but “unfortunately”, we did not publish our findings. We have internal documentation concerning similar research into integrated ITF.

There are three salient characteristics of integrated ITF. First, and departing from conventional flexible ITF, the ultimate target is not only price stability but also maintaining financial system stability. Under flexible ITF, we are just integrating the function of the target, integrating the policy strategy, not only to maintain monetary policy stability but also financial system stability. Nonetheless, we do not talk about the mandate. Integrated

ITF is more concrete. The ultimate target is not only price stability but also maintaining financial system stability. We have a dual mandate, which could be two primary mandates or a primary and secondary mandate. This is one of the issues we can discuss. Second, and similar to flexible ITF, the instruments used are monetary policy, macroprudential policy and foreign capital flow management in one optimal mix. If you read the e-books, they have more concrete policy rules. This basically strengthens flexible ITF. Third, which is also like flexible ITF, policy mix formulation requires an analysis framework and macroeconomic projections that take into consideration macro-financial linkages.

Therefore, integrated ITF poses the theoretical backbone for the implementation of the central bank policy mix. In central bank policy mix implementation, three salient aspects demand attention, namely: (i) how the dual targets of price stability and financial system stability can be integrated; (ii) the mix of policy instruments to use; and (iii) the effectiveness of the transmission mechanism. This is the subject of the research because these are frontier ideas that require further elaboration through future research.

The description in the upper part explains how price stability and financial system stability can be integrated into the dual mandate of the central bank. In Indonesia, for the case of Bank Indonesia, the authorities in charge of financial system stability are not just the central bank or the Indonesian Financial Services Authority (OJK) but also the Deposit Insurance Corporation (LPS) and Ministry of Finance, which all come together under the auspices of the National Financial System Stability Committee. We share the responsibility for financial system stability. That is why the main mandate of Bank Indonesia is to maintain and achieve currency stability, including inflation and exchange rate stability. To achieve financial system stability, our perspective is to support maintaining price stability because there are four authorities that have the same responsibility to guide financial system stability.

Salient Policy Responses: Pro-Stability And Pro-Growth

Let me share Indonesia's economic journey in 2018-2019 and describe Bank Indonesia's policy mix. We experienced a long journey last year which provides three important lessons to strengthen synergy in order to enhance resilience and encourage economic growth amidst global economic conditions that remain unfavorable. From our perspective, we have put two strategies into the central bank policy mix. We still hold our mandate to maintain stability but facing the global uncertainty that has impacted lower potential economic growth, the strategy depends on the preferences of the central bank. The central bank's main preferences are inflation deviation and output deviation, the rest is just about preference. Therefore, pro-stability and pro-growth are our strategy in 2019.

To maintain price stability, Bank Indonesia will preserve a pre-emptive and ahead-of-the-curve monetary policy stance in 2019. For this reason, several salient policy responses are to be done. First, the interest rate policy will continue to be directed to ensure that inflation is under control to achieve its target, namely $3.5\% \pm 1\%$ in 2019 and $3.0\% \pm 1\%$ in 2020. This is our disinflation path from $6.0\% \pm 1\%$ just a few years ago. This clearly demonstrates the performance of the ITF regime we adopted in 2005 in terms of bringing down stable inflation. Second, the market mechanism for maintaining rupiah exchange rate stability continues to be encouraged, without reducing the need for intervention. We have created a balance. Of course, we need market mechanisms as our basic guidance to preserve a flexible exchange rate regime but when we see potential volatility that will cheat the market expectations, we intervene as a last resort. Third, adequacy of foreign exchange reserves will continue to be maintained. Fourth, adequacy of liquidity in the money market and banking industry will also be maintained.

If we talk about traditional medicine, Jamu, we see that there is bitter medicine and sweet medicine. So, we put it in a more balanced strategy. To build economic growth momentum, Bank Indonesia applies macroprudential policies, payment system policies, financial market deepening and development of Islamic economy and finance. I do not want to elaborate in more detail because we will present the Indonesian case on the third day as shared by our colleagues from Bank Indonesia. Basically, this is a representation of how Bank Indonesia articulates its way to implement the policy mix strategy. Behind the strategy, there will of course be rigorous work done by our departments in terms of monetary policy and macroprudential policy. They have a modelling structure, policy rules and other discussions and policymaking decisions. Frontier research is used to back up sound policy.

Challenges Ahead

In the last part, I would like to share my view about the challenges ahead in terms of managing the emergence of the digital economy and technological advancement. Amidst all the global and domestic challenges due to the widespread impact of the AFC and the GFC, it is also important to understand potential new crises if the digital economy uprising is not managed properly. Even the cause of GCF, 10 years ago, was based on the real sector, especially property, but the exposure to unanticipated financial derivatives, such as risky subprime mortgage securities and a lack of prudential financial sector regulation, were the contributory factors of the crisis. We have to be aware of progress of new technology. Hence, we have to anticipate the next future challenges, such as the massive emergence of new forms of financial intermediation and the risk exposures following the exponential growth of shadow banking and financial technology (FinTech) development. The massive advance of technological aspects in delivering financial transactions and other digital economic challenges need a 3-A approach according to Mersch (2017), from the European commission. First,

Adapt policies to take into account technology-driven socio-economic changes. Second, Adopt appropriate technology that supports the various functions and tasks of central banks. Third, Anticipate technological risks to operations. Of course, uncontrolled situations will continue to persist and technological advancement will continue to impact monetary policy. There has not been an impact on monetary policy yet but perhaps in the future. Money is growing along with technology, so it will have an impact on how we operate monetary policy. This is important to understand.

In applying the 3-A concept as mentioned earlier, central banks and financial institutions require transformative shifts, including a change of mindset, a measure of interconnected behaviour and integrated policy formulation beyond standard central bank policy wisdom. In that sense, coordination becomes more critical, especially coordination across ministries and agencies to build a digital economic and financial ecosystem. Synergy between central banks and the financial services authorities on digital financial policies is needed when implementing a payment system based on digital financial policies that could encourage better financial intermediation. Besides, establishment of a national committee for the development of digital finance becomes more crucial. Amongst the government ministries and agencies, we are already discussing the need for us to have a formal, integrated national committee for the development of the digital economy and finance. In Indonesia, we are finalizing the blueprint for the digital economy and finance. It has not been finalized yet so unfortunately, I am unable to share.

Closing

This course has succeeded in gathering the brightest minds with experience in both academia and financial practices in the area of the Central Bank Policy Mix. We are lucky that all the issue discussed above will be delivered by a great team, consisting of various senior economists from the

IMF-STI, Reserve Bank of India, Central Bank of the Republic of Turkey and Bank Indonesia.

I am convinced we will agree that the challenges faced by the authorities in the macroeconomics area have become more complex over time. Going forward, we really hope that this course will strategically contribute to knowledge-based enhancement in functioning our role as central bankers and the public institution policymakers.

Before I end my remarks, on behalf of Bank Indonesia, I would like to express my sincere gratitude to: (i) IMF-STI for a prolonged and wonderful collaboration; (ii) the distinguished speakers for their willingness to share expertise and knowledge; (iii) the participant for taking time to concentrate and contribute to this enlightening course.

May God Almighty bless and enlighten our steps towards a better future. Please enjoy a fruitful and lively discussion and have a pleasant stay in Indonesia.

MONETARY THEORY AND POLICY

3. Monetary Policy

Nathan Epstein, Ole Rummel, and Stephan Damminger

Introduction

This chapter is the overview lecture on monetary policy. The discussion will be focused on assessing the monetary policy stance, the role of communications, and digging monetary policy into more detail. We will talk about the basic principles of monetary policy as well as the challenges brought on by the digital economy, bitcoin and others. Besides talking about the goals and trade-offs, we will also talk about institutional frameworks and a bit about the interactions with macroprudential policy.

First is the definition of money and what makes it acceptable. Money performs three functions as a unit of account, a store of value and a medium of exchange. For money to be accepted in the old days, by exchanging shells or stones, there was trust. If something is accepted as money, it is money. Trust is everything. Today, we have Fiat currency, money that is not backed by anything, such as gold or silver, it is just government issued. Money is the liability of both banks and non-banks.

In a nutshell, monetary policy is a set of decisions taken by a government, usually by a central bank, regarding the quantity (and the value) of money in circulation. The reason why we have moved towards the inflation targeting framework is due to the time consistency problem of money. Inflation erodes the effectiveness of money and trust in money, therefore monetary policy is important because it can affect inflation and inflation is bad for growth. Furthermore, monetary policy can also affect the level of economic activity in the short run but is neutral in the long run. Monetary policy delivers real benefits to society if conducted well. In the past, several countries like Germany experienced hyperinflation which eroded confidence and trust in money.

The three building blocks of sound monetary policy frameworks are insights, principles and effective monetary policy. When central banks conduct monetary policy, there is an incentive to cheat or to renege on earlier promises. The time inconsistency of monetary policy means that when a central bank announces policy to lower inflation, for example, it is not credible because the public knows that once lower inflation has been achieved, the next thing to do is to stimulate growth or employment, which would ultimately cause inflation to rise. It is similar to life at home when you threaten your child with punishment for misbehaving but ultimately you do not punish the child even after misbehaving. Punishment is very tough, the child may cry and sometimes we could do without the headache. Therefore, the child knows your threat will not be fulfilled and will thus misbehave. Similarly, if economic agents do not believe that the government will stick to its promise of lowering inflation, they will not act accordingly. Consequently, there is inflationary bias. In order to solve this problem, economists say that you must bind yourself to a rule or a law, like inflation targeting. If the governor is committed to achieve a certain published target, the people will believe the central bank because it takes away the incentive to cheat. That is the idea behind the inflation targeting regime. Discretion is removed by implementing a rule. Therefore, institutional commitment to price stability via credible commitment to a nominal anchor solves the time inconsistency problem along with credible communication. The focus is really on the medium term and long run. When the central bank is bound to a rule, the temptation to pursue short-run policies that inflate the economy is removed.

Principles Of Effective Monetary Policy Frameworks

These principles are very well known and broadly accepted nowadays. First, clear goals and objectives backed up with operational independence and accountability. From a monetary policy and macroprudential or supervisory perspective, the central bank or regulator must have operational independence, they cannot be subject to government interference. Second, the

primary or overriding objective of price stability. Third, a medium-term inflation goal (1-2 years), not short term. The reason is because monetary policy affects the economy with a lag. It takes time for monetary policy to influence the economy. Fourth, carefully account for policy trade-offs. Fifth, a clear and transparent operational framework aligned with market conditions and an announced policy stance. Sixth, a transparent and forward-looking strategy based on knowledge of monetary policy transmission mechanisms. Seventh, transparent and timely communication. Time and again, we find that this is a very popular topic.

Clear Goals

The central bank must set clear goals. The public must be aware about what the central bank is trying to achieve. In many jurisdictions, price stability forms part of a dual mandate. The Federal Reserve, for example, has the dual mandate of price stability and employment. Sometimes these two goals are inconsistent, so it is not an easy task. Firstly, we need central bank independence because independence can help to mitigate the inflation bias that is inherent in monetary policy. Independence implies the ability to set instruments to achieve goals without government interference. Operational central bank independence helps mitigate information bias because central banks are more forward-looking. In other words, operational central bank independence helps mitigate short-run pressures to exploit the Phillips curve trade-off between employment and inflation. There is evidence in the literature of lower inflation when central banks are more legally independent. Central banks are able to achieve lower inflation in countries where they are legally more independent. Economic (not political) independence is really what matters. There is the issue of de jure versus de facto independence and fiscal dominance. The whole reason behind central-bank independence is because we have learnt from past experience that there is fiscal dominance.

Interaction	
Participant:	Is there any relationship between central bank independence and lower inflation or economic growth?
Speaker:	Yes, I can provide references if required. Maybe 30 years ago, people were not as aware of the importance but now it has become common practice and there is consensus that central bank independence is important. People have done a lot of research on this and it has been proven that central banks with greater independence achieve better outcomes. Where should you put the macroprudential authority, for example? You want to choose a model that works best. The IMF has a Code on Transparency of Monetary Policy as part of the Financial Sector Assessment Program (FSAP) and that is one principle of independence. The central bank may not be completely politically independent, but operational independence is required.

In a sense, we are trying to remove the problem of fiscal dominance, which occurs when a central bank has to set its monetary policy to passively accommodate fiscal policy that is set in advance and will lead to an explosive path of national debt. This will also create higher inflation. It would be very difficult to control inflation due to the need to support the government.

Seigniorage is a good funding model for the government to help financial independence of the central bank. In countries that peg their currency to another currency, they may not have seigniorage. Seigniorage is the profit earned by a government by issuing currency, especially the difference between the face value of currency and the production costs. People question central bank independence due to quantitative easing (QE), where the central bank continues to inject liquidity to buy securities from the market. That must be understood, however, in the context of exhausting all

other possibilities. At that time, interest had reached its 0% lower bound and QE was found to be the only way to stimulate the economy. The argument is that you must understand the context, rather than just say the central bank is trying to help the government as its printing press. Furthermore, you saw that inflation did not increase that much in the aftermath of QE. The way to manage expectations is to announce plans to reverse QE. That is what actually triggered the Taper Tantrum in 2013, when Ben Bernanke announced plans to reverse QE. That is all behind us now because the Federal Reserve is now hiking rates, although they are currently pausing. Regardless of who sets the monetary policy goals (central bank, government, society), they should be rarely changed, especially when price stability is achieved, otherwise there is time-inconsistency risk. The central bank is accountable/responsible for achieving the monetary policy goals. In addition, if the monetary policy goals are transparent, there is less scope for manipulation of monetary policy. With independence, a central bank must also have accountability. There is independence in exchange for greater accountability. The central bank is required to report to Parliament and explain why any goals have not been met.

Price Stability as a Primary Goal of Monetary Policy

In the short-term, prices and wages are sticky, therefore there is a trade-off between stabilizing unemployment and inflation. That is the famous Phillips curve. In the long term, prices and wages adjust, so inflation expectations catch up and become consistent with actual inflation. Consequently, there is no unemployment-inflation trade-off. The Phillips curve is vertical and there is a neutrality of monetary policy. Most people now accept long-term money neutrality. There would be no point trying to lower unemployment with higher inflation. Money has no real effect in the long run.

Inflation as A Medium-Term Objective

In the short-term, monetary policy affects the economy with a lag. When a central bank announces its inflation targeting goal, it is with a medium-term perspective. Monetary policy should not respond to cyclical movements.

Trade-Offs With Price Stability

The magnitude and pace of policy adjustments should be guided by the primary objective (price stability) but central banks should also consider the implications for macroeconomic activity and financial stability. It is not easy because when property prices are going up, for example, and the central bank has to lower interest rates to stimulate growth, the central bank would have to consult and discuss the best course of action. This underscores precisely the importance of institutional design to bring about an effective policy mix to achieve price stability and financial stability. The fourth principle is the impossible trinity, namely that it is not possible to simultaneously complete exchange rate stability, independent monetary policy and financial integration with the global economy (capital mobility). Only two out of the three goals are achievable. Therefore, a central bank must choose a monetary policy framework that is consistent with the prevailing exchange rate regime and degree of capital mobility.

Most central banks in the region have moved towards a flexible exchange rate regime as a shock absorber that also allows for autonomous monetary policy. Having a flexible exchange rate helps the central bank to adjust more quickly, so that internal prices do not have to adjust as much, and thus absorb shocks. Having capital mobility exacerbates that trade-off. Do you use the interest rate to influence the exchange rate? Do you peg your

exchange rate? Policymakers always face challenges, especially when the capital account is opened up. Greater capital mobility complicates exchange rate management, namely the flow in and out. How do you best manage your exchange rate and inflation in this kind of environment, when your domestic monetary conditions are tied to global monetary conditions, including the spillover effect from global developments, such as an FFR hike in the United States. Policy trade-offs arise in regard to monetary policy when the central bank has multiple goals and no clear hierarchy of objectives or, in the long run, when there is more than one goal. It is very foolhardy to think that central banks only care about price stability. Of course, under the inflation targeting rule, it is coded as such but there are also multiple objectives. In developing countries, where the monetary policy framework is underdeveloped, you can see the central bank has multiple objectives, including human resource management. With no clear hierarchy of objectives, it is very difficult for the central bank to achieve so many goals, which can also be conflicting, in an effective manner. This could result in very bad outcomes, meaning inflation.

Align Market Conditions With Announced Policy Stance

The idea here is to anchor price stability and anchor inflation expectations. They must not get out of hand. To that end, a good, well-functioning framework is required and one of the most important things to have is a well-functioning money market for the central bank to conduct monetary operations in order to achieve the policy interest rate. The central bank must clearly announce its policy stance, which is linked to the medium-term inflation objective. Communication has recently been elevated to become a monetary policy tool. It is one of the key elements underpinning effective policy and being able to influence expectations.

Forward-Looking Monetary Policy Strategy Based On The Monetary Transmission Mechanism

The monetary policy strategy must be forward-looking and pre-emptive due to the dynamic nature of monetary policy and transmission lags. The central bank cannot allow itself to fall behind the curve. Last year in Indonesia there were six rounds of policy rate hikes. At that time, the central bank governor was regularly quoted as saying 'frontloaded', 'pre-emptive' and 'ahead of the curve'. Last year's rate hikes were effectively communicated as a defensive move in response to the Federal Reserve's rate hikes. The BI governor was very clear with effective communication.

Transparent And Timely Communication

Transparent and timely communication is important through periodic reports with a set schedule, such as periodic inflation reports and regular reporting to parliament. There must be a focus on explaining the actions necessary to align expected inflation outcomes with the policy objective. It is important for credibility to say what you do and do what you say. Furthermore, credibility helps to anchor inflation expectations when the words are confirmed by actions and outcomes.

Importance Of Institutions

The last principle is the importance of institutions. Good and stable monetary policy is now seen as resting on three pillars. First is a firm mandate with a priority on price stability and some weights on real stabilization. Usually, the central bank mandate is price stability and growth, but more priority should be given to price stability. Second, operational independence is required to avoid short-term political interference and enhance the central bank's ability to pursue its legal mandate. Third, accountability to the government and public, strengthened with transparency and clear communication.

Recent Development On The Digital Economy

That is my introduction to monetary policy but where do we go from here? What are the recent developments with the digital economy and new challenges? Money and the medium of transactions are evolving. Now, there is electronic money or e-money, centralized e-money (PayPal, M-Pesa), decentralized e-money (digital currency) and demonetization (eliminating large bills). M-Pesa is a mobile payment company from Kenya. In countries where people have no access to finance, e-money tends to grow very quickly. In Kenya, street hawkers and market traders use mobile phones for payments. Digital currencies, central bank digital currencies in particular, may replace or undermine the central bank's ability to control money. The most famous demonetization episode occurred in India in November 2016, where the central bank suddenly announced that it would phase out the 500 and 1,000 rupees overnight. That caused a lot of problems but the positive thing was that it triggered a surge of digital payments in the aftermath of demonetization by around 700%. I do not think it was the government's objective to stimulate the e-economy through demonetization, they did it to weed out money laundering.

Bitcoin. Of course, I have to mention Bitcoin, which was the world's first decentralized digital currency. Bitcoin prices have been so volatile, peaking at USD19,000 and now falling to around USD5,000. A lot of people who invested in bitcoin got burned. Bitcoin was not issued by any central monetary authority, it is underpinned by a peer-to-peer computer network of users generated as computers in the network execute complex math tasks, known as Bitcoin mining, which is then verified later by all users. The creator is a mysterious man under the pseudonym of Satoshi Nakamoto but no one has seen his face. He issued a White Paper on Bitcoin and block-chain technology. Math protocols have been set up to make it increasingly more difficult to mine bitcoins over time as the chain becomes longer and longer, with a limit of around 21 million. Roughly every 10 minutes, 25 new bitcoins are mined. Mining bitcoins is intentionally resource intensive and difficult so

that daily new issues remain steady, which assures predictable scarcity and self-regulates against counterfeiting. Bitcoin mining requires supercomputers and the impact on the environment has been called into question lately. Bitcoin can be bought and sold but the currency remains not widely used or accepted. I think that Bitcoin is misunderstood. When you talk about block-chain, people think about Bitcoin but it is important to realize that block-chain technology is a very important, transformative technology. Some people even say it could change the world. The block-chain technology underpinning Bitcoin is a decentralized system that establishes trust in an environment where there is no trust. Different entities can collaborate and execute transactions without a central party. Removing the central party is the core of block-chain technology. It is totally decentralized. IT guys understand block-chain very well because it is a distributed ledger/database. The way consensus is achieved is through proof of work. Authenticity must be proved. Nowadays, the application is very broad across many industries. Central banks have also gotten onto the bandwagon and central banks around the world have issued their own digital currencies, especially in the application of payment systems. In Canada, there is Project Jasper. There is also a collaboration between Singapore and Thailand to try and achieve cross-border payments using central bank-issued digital currencies. At the Monetary Authority of Singapore (MAS), there is Project Ubin, where MAS has issued tokenized assets (central bank digital currency) to be used for payments transacting between banks. They have already reached Phase 4. In Phase 3, they managed to achieve netting of payments without the central bank. Therefore, you can see why central banks want to get into this space. Before you become a mediator, however, it is important to understand the game. This is a game changer. Now, the whole initiative has shifted to work with Thailand and the Bank of Canada to try and achieve cross-border settlement of the central bank-issued digital currency. Experiments in the payments space are already widespread.

Monetary Policy And Macroprudential Policy

Monetary policy and macroprudential policy have to work together. Macroprudential policy works imperfectly and if knowledge is limited, then monetary policy may have a residual role in ensuring financial stability after price stability. If you happen to have the financial and business cycles in sync, you could potentially use the interest rate to good effect. If housing prices and growth are running high, namely house prices and CPI are rising, the central bank could hike interest rates to bring it down. In cases where monetary policy is constrained because you are in a pact regime or a currency union, there is increasing demand to use macroprudential policy to achieve different growth but it should not be seen as a substitute. There are institutional limits, so safeguards are required, including a clear mandate, decision-making, accountability, and communication structure.

Macroprudential Policy: Lean Against The Wind

Nowadays, it is widely accepted that monetary policy should help macroprudential policy lean against the wind in ensuring financial stability, meaning to dampen financial risk. In a lot of jurisdictions, financial stability is the secondary objective of the monetary policy strategy. As we have seen in Indonesia, there is a movement towards a more flexible inflation targeting regime, which takes into account financial stability and helps to lean against asset price bubbles. In plain words, you are saying that you cannot just be operating monetary policy without regard to the effect it has on financial stability. If you do not intervene on the way up, the outcome of a crisis will be worse.

Where Do We Go From Here?

In terms of the recent developments and new challenges, the thinking surrounding monetary policy is evolving and that evolution depends on country-specific factors. We need to understand more about the digital

economy and intermediating different agents around the world, including the way that monetary policy is conducted. Has the evolution undermined or reduced the effectiveness of monetary policy? We need to learn about the international good practices, which are also evolving. The theories are evolving and monetary policy frameworks are evolving. We need to collaborate more about how monetary policies will evolve.

I have presented a lot of questions for discussion. Would any of you like to share your own experiences or thoughts in this area? Have any of you purchased Bitcoins? Nowadays, there are stable coins, which are actually underpinned by gold or an algorithm that makes it stable. Stable coins are becoming quite popular because they address the issue of volatility.

Interaction	
<i>Speaker:</i>	I am just curious. Is it possible to have initial coin offerings (ICO) in Indonesia and how big is the ICO market? An ICO is just a promise against raising funds that you will participate in a virtual security that may or may not pay off. I know from some studies I have seen in Singapore that this is not such a small activity in some financial sectors. I am curious if that is the case in Indonesia.
<i>Participant:</i>	In Turkey, this is not permitted. However, this is food for thought.
<i>Speaker:</i>	Within any of the central banks, do you have or practice with such tools for internal use? At the IMF, they are now practicing with internal coin offerings for the staff to understand how the mechanism works. I find that quite useful because we get into conversations with others about what is down the line and the rationale behind determining the prices. Are there any such initiatives at the central banks represented here? It generates the

<i>Speaker:</i>	<p>discussions that we need to understand as central bankers and supervisors how these things operate.</p> <p>At the IMF, if you attend a seminar, you can get the coin and then use it to purchase food and beverages in the canteen.</p>
<i>Participant:</i>	<p>I am not so sure about the details of Bitcoin in Indonesia because I am not in a related department at Bank Indonesia. As far as I know, Bank Indonesia only allows rupiah in the customs territory of the Republic of Indonesia. Virtual currency is prohibited in Indonesia.</p>
<i>Speaker:</i>	<p>In Singapore, near MAS, if you walk down the road there is a café that accepts Bitcoin. A taxi driver has become famous for only accepting Bitcoin in Puerto Rico, an area devastated by Hurricane Maria in 2017. When you start with a country that has been totally devastated, it is ripe for using a new transformative technology. Therefore, there is a group of block-chain venture capitalists and technologists who moved to Puerto Rico. If you are interested in what block-chain can do, please read the Puerto Rico case. It is very interesting. They are using block-chain for everything from farmers to taxi drivers. Puerto Rico is a very interesting case study but some people doubted it would work. The more use cases there are for this technology, the more it can improve. A lot of the problems concerning the scalability of block-chain have been resolved by using other kinds of models that permissioned networks that only identified people can access. This reduces the scalability problem.</p>
<i>Participant:</i>	<p>Given these developments and new technologies, what</p>

about cyber-risk, which could cause massive disruption?
What are we doing to minimize the cyber-risk?

Speaker:

Cyber-risk is a key risk in the regulators' and central bankers' mind. There have been many famous hacking cases around the world. Cyber security and data privacy are very important. A lot of things have changed in some countries, for example work computers cannot be used to surf the internet. Virtual private networks (VPN) are used along with two-factor authentication. There are also mobile applications that can generate strong passwords as required. Cross-country bodies are also being set up on cyber-risk. People are constantly monitoring financial institutions. Apparently, there are tens of thousands of hacks attempted on a daily basis. The key is to know which ones are most important in terms of escalating upwards. Basically, hackers are trying all the time to breach systems. That does not mean you stop participating because of the risk. That would be too extreme. Cyber-risk can certainly cause massive disruption.

Speaker:

In the public domain, I think one of the biggest challenges managing cyber-risk at an international and supervisory level from a systemic risk aspect is information sharing. That is where we, as regulators, have to explore how we can ensure that information on vulnerabilities can be shared and that minimum standards are set to ensure that not the weakest link becomes the entry point. That is the way the dialogue is progressing in many of these working groups. The G20 has a working group that involves many of the participants' countries. That is the direction of the public sector. There are lots of technological challenges but

	<p>I feel that is where the market needs to step in through incentives to ensure that these risks are well managed. Financial institutions cannot risk their reputation being lost by having just one event, so the incentives are there, it just requires the technological solutions.</p>
<i>Participant:</i>	<p>When we see our daily routine in our communities, sometimes the medium of exchange does not necessarily depend on the money, whether it is in the form of paper or otherwise. In a more complex situation, however, around the world, we also know about carbon trading not using money as a medium of exchange. This is also interesting for central banks to consider in future, especially in the digital era. The medium of exchange is evolving into a more rational tool. People exchange their goods or services in the other forms.</p>
<i>Speaker:</i>	<p>The three functions of money as a medium of exchange are clearly under threat in that money may not be required any more as everything becomes electronic. In Scandinavia, Sweden is in the process of thinking about phasing out hard cash. Block-chain is so transformative because if you think about the internet as an exchange of information, block-chain is about the exchange of value. That is why it is so fundamental. You can use block-chain technology for anything that involves an exchange of value in a secured environment.</p>
<i>Participant:</i>	<p>Concerning crypto currencies in Malaysia, crypto currencies are not legal tender but we recently started to allow ICOs to operate in the sense that they are a medium to raise funds. We see ICOs as securities, which falls under</p>

the auspices of the Securities Commission. There is also a large corporation in Malaysia, which initially planned to raise funds using ICOs that are considered as securities. However, the corporation would then also like to offer the holders of ICOs to use that as a medium of exchange to purchase stuff. To raise funds is okay, but to use as a medium of exchange within the corporate group itself still divides us. The debate is ongoing. The discussion also looked at where the regulation would start if we allowed it. What is the threshold when it starts to become money?

Speaker:

One misconception is that ICOs are just a new way to raise funds. It is a coin offering without the coins. You need not have a coin issued, especially because in many countries these kinds of coins are not accepted, so who would you transact with? It is an ICO without the C.

Takeaways. We are here because monetary policy affects people's lives because of price stability. We are there to ensure price stability. Operationally, monetary policy should be underpinned by operational independence to insulate the central bank from short-run pressures to exploit the Phillips curve trade-off between employment and inflation and demands from the government to be its printing press. As with everything in life, there is always a trade-off when conducting monetary policy. It is important that this trade-off is recognized. The central bank may have multiple goals but also needs a clear hierarchy, meaning that price stability is the primary objective and the others are secondary objectives. Effective institutions are necessary to help the effectiveness of monetary policy.

Policy Framework Review

This review will give an overview on some of the tools and practices that I use to the extent that they are high-level and too simplistic. We will

have a session on monetary transmission mechanisms and I would like to talk about financial innovation, technology and what the impact may be on the effectiveness and channels of transmission. Something that has come up is initial coin offerings. In terms of size, ICOs are not a systemically important activity but I think it demonstrates what is happening in Malaysia, Singapore and other places. I think the sharing of information, where it happens and how it evolves, is important. You might think that this is something that happens in your financial marketplace but it may already be the result of some regulatory arbitrage. People may have realized that it is easier in your jurisdiction than in a different one. As central bankers and supervisors, it is important to use forums like this to exchange these ideas.

Inflation And Monetary Policy

The goal of monetary policy is price stability, with output and employment often the secondary objectives. Exchange rate stability generally falls under the general package of financial stability, as secondary goals. I would like to talk about inflation and the determinants of inflation. The reason is not just because it is the goal but because it has become obvious over the last 50 years, in terms of empirical analysis, that there is a trade-off between output and activity that is often within the purview of the government, unless it is part of the central bank's purview, and price stability. Hence, just focusing on price stability without regard to output does not work. You give something up and you need the tool to address price stability, which is often demand, and that generates effects on prices. We need to understand inflation and assess inflation as well as the stance and the impact our tools have on achieving that goal. Among the key goals of economic policymakers are low inflation and low unemployment, which sometimes conflict. In the short run, if policymakers try to expand aggregate demand (using monetary or fiscal policy) they will tend to increase output (decrease unemployment) and raise the inflation rate. The ability to assess inflation and monetary policy stance are, therefore, critical in limiting potential conflicts

between the two key macroeconomic policy objectives. With that in mind, we are going to talk first about the determinants of inflation before discussing monetary policy regimes and transmission. I would like to have a little excursion about what the digital economy might do to monetary policy transmission. At the end, I will walk through different practices of how to assess the effectiveness of monetary policy stance.

Long-Run Determinants Of Inflation

The long-run determinants of inflation are something that we always hear about but do not know that much about what inflation drives in 10 years or 15 years, except perhaps in the very long run, the amount of money that is supplied is affected that matters. Milton Friedman said that “Inflation is always and everywhere a monetary phenomenon.” I think it is not always a monetary phenomenon, but it is at some point for those of you who are new to that topic. We would put as a basic framework of thinking that the price is something that comes out of the relationship of the money that is supplied plus the velocity or turnover rate (how often it is used) versus the amount of items that are produced. The changes in the components of quantity theory, as the general theory of inflation, from a theoretical perspective, if the behavior of holding money is roughly unchanged, if your potential growth is fixed and does not change, the only way you are going to change long-run prices is through changes in money supply. That is where it comes from. Nowadays, monetary policy basics are not anchored as much on this. It used to be quite a bit. The Bundesbank was a strong supporter of that. Now, we have come to a different approach. If the long run is not something we can really understand or do not care as much about, then we should probably focus on the medium term. Nevertheless, that also is probably not right. Even short-term fluctuations can have important effects on the rate of price change in a more persistent way. Think of an oil-price shock, it can affect the cost of production, set off wage cost-push inflation that may lead into a spiral of higher inflation that could affect expectations and then you are stuck. Even

something that is temporary, we need to understand as monetary policymakers because it has the potential to have a persistent effect. With this in mind, through menti.com I would like to ask what you consider the most important drivers of inflation in your country are, ranked in order of importance.

Inflation Drivers

I understand that this is a diverse group but I think we have a regional perspective on what the inflation drivers could be. Based on your answers, there are three main drivers of inflation, namely the exchange rate, inflation expectations and others, which we can talk about in a second. It is interesting to note that some of you believe inflation expectations are a very strong driver, whereas others think it has no effect. Likewise, some people think the output or unemployment gap is very important but others do not see a relationship. The exchange rate has a more homogenous distribution. Inflation persistence is all over the map. I think that is not such an unrealistic depiction of what the literature tells us empirically. A number of these factors have been identified and none stand out as always the strongest component, but they all matter. It is fair to say that domestic demand and supply pressures, business cycle factors in particular, were the core of the original thinking around what drives inflation. If demand is higher than the potential capacity in a country, prices tend to go up and vice versa. Other factors, such as external spillovers and expectations as well as past inflation, which is a behavior on how we learn about prices, are often augmented around the model.

Phillips Curve

The Phillips curve is the core, single equation that is often used to describe the determinants of inflation. It was literally an empirical observation that has been augmented over time with theory. The main

drivers are output, which is GDP growth, versus some kind of a potential with a delta, Δ , that is estimated to be positive, telling you that if there is a positive factor, meaning that actual is higher than potential, you would have upward pressure. The unemployment rate is considered as a different proxy. Then you have the expected inflation upfront. This is the alpha that often pushes countries. If the alpha is close to 1, there is a push of actual inflation being pulled there, with fluctuations around. Then there are shocks.

Augmented New-Keynesian Phillips Curve

As understanding developed that while prices are persistent, often there are contracts, people do not observe actual changes in activity around themselves and the setting often happens as a weighted average of backward-looking inflation and forward-looking inflation. That came with the realization that prices are not as flexible as perhaps asset prices on stock markets, hence we have a lagged component. If you remember, here was the output gap, which is the difference between the actual and the potential, like a fictional potential that an economy could generate. When you look at the price setting on a more micro-basis, you could say that what actually matters is the change in the real marginal cost that is happening during a period of time. If the real cost of adding the last unit is very high, you will properly set your price very high because that is the last unit. If it is lower, your price as a factor of the cost is weighing at the lower rate into setting the price. The real marginal cost may increase due to demand, in response to produce more or a cost-push factor. If the input cost rises, firms may ask to raise the real marginal cost on the supply side.

Components of Real Marginal Cost

What are the most common factors that drive the real marginal cost? Real marginal cost (RMC) can be approximated by two factors as a function of a domestic component, namely prices being pushed up or down depending on the slack (gap) in the economy, such as the output gap,

unemployment gap or real wage gap if real wages are countercyclical. The other factor is the external component, including the real exchange rate gap (anchor equilibrium) or import price gap. If the prices of imports that are hard to substitute change, that would also feed into the real marginal cost. Often, the augmented Phillips curve that you see in the literature and that you probably estimate yourself looks like this, with the lag values and expected values of inflation and then the real marginal cost estimated or approximated as a linear composition of the output gap. This means there is a difference between the actual and the potential.

In terms of estimation, these drivers can be estimated directly. The data can tell you the factors. Countries do it over a time series, through regional variations or through cross-country time series (panel estimates). In the United States, and other countries that have deeper information, Bayesian techniques are used, where they have priors and what certain variables should be and then they estimate a model that fits best. If you want to have a small system, Laubach Williams is one of the methods still used by the Federal Reserve in the United States to draw out what the real interest rate is. For part of that, they use an augmented Phillips curve, which can be estimated to get these parameters out. Expectations would be coming through here, past inflation would be a component that some of you thought important. The output gap or demand would come through here and then 'others' could be shocks, which might be in your mind. That is a lot of theory, but does it actually bear out empirically? I thought it would be useful to have some evidence that this model does still relevant and is important.

This was published last October in the World Economic Output Chapter and it was about the effectiveness of monetary policy in emerging markets. As part of that exercise, the authors estimated a Phillips curve for emerging market economies and reported the estimates, these coefficients, here. Tough to see but inflation expectations are the second component and past inflation is the first component. Therefore, the coefficient is 0.5-0.6,

which is not a small amount. Persistence is fairly high but it is clearly different from 0. The data is up to 2017. The output gap is 0.2. Changes in the output gap and the coefficient that then affects inflation is 0.2 and that is already close to 0. That is an observation we have seen in advanced economies but other economies as well, where the response of the cycle on inflation is more muted than it was in the past. The foreign output gap is basically how the world cycle affects emerging economies, which was not found to be significant. External price pressure is a very small coefficient but we will not talk about the coefficient, we need to know how the variable is defined to say whether it is economically meaningful. It is bigger than 0 but external prices have an effect on inflation. That is just something to convince you that it still matters. In Indonesia, a paper published in 2011 said that the Phillips curve mattered but a more recent external paper showed that the effect has become very small. Will the other effects still matter, namely inflation expectations and past inflation? Is it true that you are using a model to inform your inflation understanding process empirically? Are your results similar? Has anyone here been working actively in terms of estimating the Phillips curve?

Interaction	
<i>Participant:</i>	We are using a modified quarterly projection QPMSR model, core model. Concerning inflation expectations, the coefficient is higher than before but the coefficient of past inflation is lower right now. As you said, the output gap is also lower and the exchange rate is lower because the exchange rate pass-through is getting smaller as we are in a period of lower inflation.
<i>Speaker:</i>	How do you explain that past inflation has declined but inflation expectations have increased in terms of the coefficient or driver?

<i>Participant:</i>	<p>It should be the opposite, right? If we put the inflation expectations as the alpha, the past should be $1 - \alpha$. Credibility has led to that change. We think that the central bank right now is becoming more credible. That is why the coefficient of inflation expectations is getting higher.</p>
<i>Speaker:</i>	<p>I am going to ask you a different question. Are you potentially worried that this could also be a concern based on the fact that the exchange rate has been very stable and possibly, if there was a regime change, who knows, capital flows may go out and there may be, at some point, a need to defend or pre-emptively raise rates? There also may be more volatility coming as a result at some point. How stable do you think these effects are? Is there a possibility that risk-taking might be higher than normal because people have put a lot of weight now on expectations, which are very stable, while forward-looking you might see some turbulence? Do they take the risks into account?</p>
<i>Participant:</i>	<p>I am not sure about that but the Governor always says that Bank Indonesia has raised interest rates lately in order to stabilize the external shocks. That is why the people believe that the Governor always stabilizes the exchange rate.</p>
<i>Speaker:</i>	<p>Therefore, the argument is exactly because of that risk, the rates were raised and people feel that is justified in having those stable expectations because the central bank moved in anticipation of a potential impact on stability that would come through possible external price pressures or feed through the foreign output gap.</p>

<i>Participant:</i>	<p>At our central bank, we have conducted research into the determinants of inflation expectations using the central bank's survey of expectations. The survey also looks at other macroeconomic variables as well as the people's expectations in the financial sector of the real sector. We also look at the time-varying coefficient. In terms of inflation expectations, we have seen that since the recent turmoil in Turkey, the coefficient of the exchange rate increased sharply but after the central bank tightened monetary policy, the coefficient began to decline. Concerning the effect of past inflation, it has been the same. As inflation increases, people give more weight to past inflation when they are forming inflation expectations and vice versa. We also look at the impact of monetary policy (prices) on inflation expectations. When we started to use more conventional monetary policy tools, like the interest rate corridor, we saw that when we had price tightening, the inflation expectations got lower. If the central bank implements tighter-than-expected monetary policy, we see an impact on inflation expectations.</p>
<i>Speaker:</i>	<p>The two takeaways, and you can correct me, you talked about an inflation analysis based on surveys, which is interesting. I will show you something shortly from South Korea and their past inflation has a strong impact, especially when there was a big shock, when the past inflation effect becomes bigger. We have seen that not only in Turkey but many other countries also. Survey data has a much stronger component on past inflation in the current perception of people's expectations of future inflation. As someone else described, extracting information from</p>

market data or other pieces of information leads to a smaller effect. The fact that past inflation or large events can change those variables is something to watch out for. Central banks should take pride that their credibility has anchored expectations but these things should not be taken for granted. The fact that we have achieved credibility is something that needs to be strongly protected and guarded against. The point made about the effect of tightening policies on re-anchoring expectations is one that is well taken and ideally you would want to be ahead of the curve but it is good that you do not lose credibility if you make difficult decisions; expectations do come back. I think Turkey went through various bouts of very high inflation, made difficult adjustments and I think people understood what was happening so expectations were re-anchored. In the early 2000's, that was also the case. World Economic Output Chapters seem to be any easier read and you can quickly skim through to see where your experience fits in to the international experience.

Monetary Policy And Transmission

It is important to remind ourselves of some of the basics. You cannot choose monetary policy strategy without making a decision about what your exchange rate arrangement is and your arrangements on capital flows. Therefore, countries need to choose a monetary policy strategy (for example, inflation targets or money growth targets), and exchange rate arrangements and the type of management of international capital flows. The choices must be compatible. That is basic wisdom that monetary policymakers and economists have agreed on. It is described in the monetary policy trilemma (impossible trinity), which basically says that only two out of the three

objectives can be achieved in a purist way. You can have monetary autonomy, namely to set interest rates independently, and you can have capital mobility but then you cannot have exchange rate stability. For example, if the world interest rate was 5% and you chose to have monetary autonomy and lower interest rates for domestic reasons to say 3%, if there was capital mobility, capital would be attracted out or less in, both of which create pressure on the exchange rate and, hence, you cannot guarantee exchange rate stability. You can make policies that try to be autonomous and allow capital mobility, and exchange rate stability may occur as a result, but it is not guaranteed. That is where many central banks have chosen to place themselves through inflation or monetary targets. Central banks desire monetary autonomy due to the possibility of responding to domestic shocks through autonomy. A central bank could also choose exchange rate stability with capital mobility OR monetary autonomy. If the exchange rate is anchored to a fixed peg and there is capital mobility, a central bank would not be able to set its interest rate independently. In other words, monetary autonomy is lost. It is simple. The exchange rate is given, unless the exchange rate you are pegged against changes. Therefore, unless you offer the same interest rate, your peg will disappear. While we do have pegs that have been successful, there have also been some that failed. It failed in a big way in Argentina. Therefore, the theoretical concepts have been practiced. Often, if you have a very hard time in terms of establishing credibility, perhaps during a post-conflict period, countries use the exchange rate as an anchor. We are seeing a transition right now to inflation targeting in Sri Lanka. Much more weight had been given to the exchange rate as a stabilizing force but now they are now shifting towards inflation targeting. Countries move in between this triangle. Emerging markets have to tread these challenges very carefully because their activity is more exposed through capital mobility than others. Countries have to choose, meaning competing demands. It is desirable to have capital mobility because if you would like to attract capital and you

would like to attract funding, capital mobility is a guarantee for an investor to enter the market, hopefully find a productive project and perhaps stay in or leave if desired. Autonomy is obviously desirable because it allows you to respond to the cycle. Exchange rate stability is the third component. You will find yourselves in this triangle.

Interaction	
Participant:	Is it possible to choose all three components of the trilemma to some degree?
Speaker:	This is the theoretical concept and you can actually find measures as to the degree of autonomy, capital mobility and exchange rate stability and you can place countries in the middle. To the extent that countries have different degrees of capital mobility, there will not be pure capital mobility components. Several large emerging economies have chosen to do that. I know that is on the table in Malaysia in the sense that if there is a lot of volatility, the central bank sees itself open to the ability to set measures to moderate it. Some people would say that is a capital flow measure, namely it is not free capital flows. I think we also have past experience in Indonesia. Exchange rate intervention may affect capital flows or the incentives, but we are not talking about intervention. Intervention is a component of allowing the exchange rate to fluctuate. Monetary policy autonomy credibility is constrained in the event of many interventions. I think what your governor is very strongly advocating is that we can actually do it, we can find ourselves in the middle and we have a regime that can transparently explain how we go about it. The outside world understands it, therefore it can be passed as

having a little bit of everything. I think we have seen it function for a while, so let us see what the long-term performance is. I think this is a very healthy discussion.

From the IMF's perspective, I am here as a trainer, so I do not get into the policy dialogue but there was a big discussion about capital flow management and what our advice is on this. Close to the global financial crisis, it was quite clear that we thought the desirable point was free capital mobility and we should have countries move in that direction sooner rather than later. Since then, we have had a lot of exchanges and discussions. At first, there was an understanding that, while it should be at least sequenced, you should think about the capacity of institutions, which is commensurate in the regulatory environment to free capital mobility. Finally, the institutional review tells us that we should, in the case of disruptive capital flows that may endanger financial stability, first act with macroeconomic tools and macroprudential policies and then, only if there is an imminent threat to stability, resort to capital flow measures. The regional voice is the one that wants to be engaged on that. It is easy for advanced economies to say not to do it if there is not the problem, you will not get affected as much by capital flows as other countries. In the region, if you are a large market and you are recipients just because you are big and there are enough assets that can be invested in, you might be a bystander. Therefore, the question is whether we should wait until there is financial instability inside or whether we should suggest that this policy as a tool should be supported earlier on. Internally, there is now a review of the institutional view for this year. Some people have now been moved around in the IMF. We have a new economic counsellor, who seems to be more interested and open to this debate but I think there are some economics and politics out there and we have to be very careful that we stay on the economic side of the discussion and not let ourselves get drawn into the politics.

Interaction	
<i>Participant:</i>	The IMF is now officially communicated that it advocates the case for capital controls close to a crisis. That is the official view.
<i>Speaker:</i>	It is not called the IMF view, it is called the institutional view.

4. Exchange Rate Policy and Regimes

Natan Epstein and Reza Y. Siregar

Introduction

This chapter will focus on exchange rate policies and regimes, including a discussion about how the IMF uses its classifications and reporting of exchange rate arrangements across the world, and also the issue of Trilemma. In many ways, a discussion on exchange rate policies does not make sense in isolation of a discussion on monetary policy. The decisions about the monetary policy regime are very much part and parcel of the decision regarding the design of a monetary policy framework. In fact, in the past, our Institute used to teach those concepts together. We actually had a course called the Monetary and Exchange Rate Policy Course. There is still value in taking stock and looking at exchange rate policies and regimes a little bit in isolation so as to not lose sight of the issues that go into the decision of the regime that the central bank want to ultimately adopt, and then to have a discussion on monetary policy.

The outline of this chapter is first to introduce the concept of exchange rate regimes and the taxonomy. We will note the extent to which countries' official and actual regimes differ. This is the concept of *de jure* and *de facto* exchange rate regimes. I will list some of the regimes that are in place, ranging from hard pegs all the way to floating. We will review the history of exchange rate arrangements and learn how exchange rate regimes fit into a broader policy context, mostly in the context of the trilemma - the impossible trinity concept developed by Robert Mundell, the famous economist of the 1960s. We will also look at the analysis of the trilemma in the context of monetary policy and the ability or inability to achieve it in tandem with a managed exchange rate regime with perfect capital mobility. Finally, there will be some discussion on the relevance of Mundell's results in this context for China, as the elephant in the room, where the action *is* right now in terms of international economic issues and policies.

What Is An Exchange Rate Regime?

Simply put, an exchange rate regime is a country's policy stance towards managing exchange rates and intervening in foreign exchange markets. This distinction is going to become important when we start talking about the way we differentiate between *de jure* and *de facto* exchange rate regimes. At its most basic, this policy stance can be described by its goal for the behavior of nominal exchange rates. When we talk about a pegged or floating exchange rate regime, we are really talking about the nominal exchange rate. In most cases, it is a bilateral exchange rate yet in some cases, it is a multilateral exchange rate. I am not talking about the real effective exchange rate or the nominal effective exchange rate. I am talking in the context of where you have a currency that may be pegged or managed, not against major currencies like the US dollar or the euro, but against a basket of currencies. At one extreme are fixed (or pegged) exchange rate regimes, which involve a commitment to exchange local currency against the foreign currency (or a basket of currencies) at a rate that is fixed. At the other extreme are floating exchange rate regimes, which involve letting the private market determined exchange rates with little or no official intervention. In between, there are a multiplicity of exchange rate regimes that vary by the degree to which exchange rates are determined in the market rather than by official actions and the type of official action used to influence exchange rates.

Taxonomy Of Exchange Rate Regimes: A Simple Classification Often Used At The IMF

At the IMF, when we look at the classification of exchange rate regimes, the spectrum is from **floating**, namely free or managed, to **soft pegs (intermediate)**, from the conventional like a peg of your domestic currency to a foreign currency, stabilized arrangement, paired with horizontal bands, as well as a crawling peg or crawling band, to **hard pegs**. What we mean by a crawling peg or crawling band is that the predictable path (crawl) tends to be determined by something like the interest rate differential between the

domestic currency and foreign currency that you want to align the fundamentals more to the movements in your exchange rate. A peg or band is really about a particular point (estimate) that you are targeting through a predictable path or a band, where you have a predictable path that is bounded by $\pm x\%$ around that midpoint. The same is true with horizontal bands. You may have a particular exchange rate level in mind and you want the exchange rate to basically move within a \pm band around that level. One difference between the horizontal and crawling bands is that horizontal is literally horizontal (one level) around the midpoint and a crawling band could slope either upwards or downwards depending on the path that you are trying to establish for the movement of your exchange rate. In terms of hard pegs, there are currency board types as well as no separate legal tender types. What currency does Bundesbank, the central bank in Germany, manage actively? The legal tender in Germany is the euro. Therefore, the central bank does not have its own currency for the management of its monetary policy or exchange rate policy. In essence, the euro is the legal tender not just for Germany but for all members of the euro-zone. That is the classic example of no separate legal tender.

Hard Pegs

No separate legal tender. Some countries adopt another country's currency. Cambodia is highly dollarized but does not belong to this category of no separate legal tender because Cambodia has its own currency (real), which is the legal currency for the payment system throughout the economy. Nonetheless, the financial system, assets and liabilities are dominated (90%) by US dollars. A country can almost be fully dollarized but still have a separate legal tender. Therefore, this would not fall under this category. The currency union within the euro area is classified under the arrangements governing the joint currency. The currency union within the euro-zone is an example where all the countries in the euro-zone do not have their own separate legal tender or the ability to have or conduct monetary and exchange rate policy in their own currency. Other countries fix their exchange rate with

strict arrangements that limit how domestic currency liquidity is managed (currency board arrangements), such as in Hong Kong. One way to differentiate between a currency board and a hard-pegged exchange rate regime is that in both situations, you have the authority's commitment to keeping the domestic currency at the level of the currency they are pegged to. The difference, however, is that with a currency board, there is a legal obligation for the central bank to exchange the domestic currency to a foreign currency at that exchange rate. On the other hand, with a pegged exchange rate, that commitment is not binding. The central bank may be communicating that it is committed to maintaining that level of exchange rate, but it is not bound by this obligation to convert every domestic and foreign currency at that level. Hong Kong and Bulgaria are examples of currency board arrangements. Another famous one that lasted until 2001 was Argentina. Argentina is a famous currency board example that was not sustainable.

Floating

In this case, there is **free floating** and **floating**. These are regimes where the central bank allows the currency to float, and the degree to which it intervenes in the foreign exchange market will determine whether it is a floating vs free-floating regime. In a floating regime, the central bank can intervene in the foreign exchange market to ensure that the currency is not too volatile. The goal is to reduce exchange rate fluctuations, without having a level in mind and the IMF will consider such a regime de facto as a floating exchange rate regime.

Soft Pegs

Soft pegs attempt to mix the stability of a peg and easier adjustments to changes in macro conditions that comes with floating rates. There is an inherent level of the exchange rate that the authorities are interested in maintaining but they allow it to float within a horizontal band, crawling band and so forth. Across time and across countries, we have found that balancing

the stability and adjustability can be very difficult and very hard to sustain. Therefore, there is a school of thought that was very popular around 20 years ago, less so today but there are still advocates around that have been pushing a bipolar view, which chooses either a hard peg or a float (aka the corner solution), anything in between is not sustainable. As economists, the whole topic of exchange rates is a topic where we have not really reached a full understanding to be mildly humble. Same is true for the corner solution, which was advocated more strongly 20 years ago, especially during the onset of the emerging market crisis in the 1990s; it sounds good but in practice it can be difficult to maintain and sustain over time.

De Jure And De Facto Regimes

Part of the IMF mandate is to monitor exchange rate regimes for all of its members. Each member is essentially obligated to report to the Fund about its exchange rate mandate and that is where the de jure comes in. If the authorities legislate that its exchange rate is floating, the IMF will report it as de jure floating. In other words, it is not open to question vis-à-vis the IMF staff as to what the authorities are stating explicitly when it comes to de jure. De jure is the official stated exchange rate regime on the books. However, the IMF is very much in the business of monitoring and pontificating about how they actually see the exchange rate regime operating in practice (de facto). In many countries, there is disconnect between how policymakers officially describe their exchange rate regime (de jure) and how the exchange rate behaves in practice (de facto). The disconnect can come from two possibilities: i) countries that are de jure pegged but adjust the peg often; ii) countries that are de jure floaters but limited exchange rate fluctuations, for example by intervening, sometimes heavily, in the FX markets. The second possibility is more common.

IMF AREAER: De Facto Regimes

Here is a table (Table 1) from the IMF Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER). Unless you work in the

monetary and capital market department, this is not a well-known report. The annual report often boils down to a long report that details not just what the exchange rate regimes are (de jure and de facto), but it also has a long list of the reporting on the actual restrictions, including capital flow restrictions, all financial and capital account measures that are put in place to restrict the movement of capital, to make it more or less expensive to convert FX to local currency, remunerated reserve requirements and so on. All these things are contained in this report, which is compiled annually. In fact, it is one of those products that you do not see often produced by the IMF, which has literally been produced jointly between the IMF staff and country authorities. This document is sent every year to the IMF staff, who go through the report and do their own updating. The report is then sent to the authorities, who themselves edit and track change their own text into the report regarding their own view of the exchange rate regime and so forth. Every member country is obliged to report this data. I am showing you data from the 2016 report. Each year, the report is published around the IMF Spring Meeting. The 2016 report was published in April 2017 as of the end of 2016. What we see here is essentially a breakdown of the different regimes, from hard pegs to soft pegs to floating and to this 'residual'. What we see here is that, by and large, the share of the regimes in the classification has not really changed much. It changes a little bit sometimes at the margins. You may see some fluctuations around this stabilized arrangement but for the most part, if you look at the broad category of the hard peg, it has remained at 12-13% of the membership, with soft peg at 40% and floating at around 37% of the members. At the bottom, there is the 'other managed arrangement'. Each report contains the definitions for each arrangement.

Table 4.1. Exchange Rate Arrangements, 2008-16
(Percent of IMF members as of April 30)¹

Exchange Rate Arrangement	2008	2009	2010	2011	2012	2013	2014	2015	2016
Hard peg	12.2	12.2	13.2	13.2	13.2	13.1	13.1	12.6	13.0
No separate legal tender	5.3	5.3	6.3	6.8	6.8	6.8	6.8	6.8	7.3
Currency board	6.9	6.9	6.9	6.3	6.3	6.3	6.3	5.8	5.7
Soft peg	39.9	34.6	39.7	43.2	39.5	42.9	43.5	47.1	39.6
Conventional peg	22.3	22.3	23.3	22.6	22.6	23.6	23.0	23.0	22.9
Stabilized arrangement	12.8	6.9	12.7	12.1	8.4	9.9	11.0	11.5	9.4
Crawling peg	2.7	2.7	1.6	1.6	1.6	1.0	1.0	1.6	1.6
Crawl-like arrangement	1.1	0.5	1.1	6.3	6.3	7.9	7.9	10.5	5.2
Pegged exchange rate within horizontal bands	1.1	2.1	1.1	0.5	0.5	0.5	0.5	0.5	0.5
Floating	39.9	42.0	36.0	34.7	34.7	34.0	34.0	35.1	37.0
Floating	20.2	24.5	20.1	18.9	18.4	18.3	18.8	19.4	20.8
Free floating	19.7	17.6	15.9	15.8	16.3	15.7	15.2	15.7	16.1
Residual Other managed arrangement	8.0	11.2	11.1	8.9	12.6	9.9	9.4	5.2	10.4

Source: IMF (2016)

A stabilized arrangement is specifically an arrangement that entails a spot market exchange rate, we are not talking about forwards or NDFs, that remains within a margin of 2% for six months or more (with the exception of a specified number of outliers or step adjustments) and is not floating. The

required margin of stability can be met either with respect to a single currency or a basket of currencies. The classification does not imply a policy commitment. When you do this reporting, you look at the actual movement in the exchange rate and if it has not moved beyond 2% for the entire period, you get thrown into that bucket of a stabilized arrangement. You can see why in that previous chart there is quite a bit of movement in terms of the show of membership. This could be a temporary policy stance to intervene in a certain way to keep the exchange rate very tight, even though they are not committed to a band.

Interaction	
<i>Participant:</i>	How do you differentiate if the movement is natural or central bank intervention?
<i>Speaker:</i>	You are not distinguishing between an intervention and market-driven movements that are very low. You will see from the example of a couple of countries in this region but this is one of those arrangements that the classification of which ties to a statistical observation. There are exceptions, namely if you intervene a lot and keep your exchange rate stable, maybe even pegged but you are not calling it a peg, and then you have a stepped devaluation. Usually a stepped devaluation is more than 2%. That will then not be counted as putting you outside that bucket. You will still be in that bucket if there is a one-time stepped devaluation type move for the six months except when the movement occurred.

A floating exchange rate is largely market determined, without an ascertainable or predictable path for the rate. In particular, an exchange rate that satisfies the statistical criteria for a stabilized or a crawl-like arrangement will be classified as such unless it is clear that the stability of the exchange rate is not the result of official actions. Foreign exchange market intervention

may be either direct or indirect, and intervention serves to moderate the rate of change and prevent undue ER fluctuations not to influence or aim at achieving a particular level. When a central bank intervenes, in whatever direction, because the exchange rate happens to move very quickly in a very short period of time and the central bank is not concerned about deviation from a level but simply because there is a lot of volatility in the exchange market, that type of intervention would keep you in this bucket of a floating exchange rate regime.

A free-floating exchange rate implies that intervention occurs only exceptionally and aims to address disorderly market conditions and if the authorities have provided information or data confirming that intervention has been limited to at most three instances in the previous six months, each lasting no more than three business days. If the central bank intervenes more than three times in six months, or the intervention lasts longer than three days, it is no longer a free floater.

Finally, other managed arrangements are a residual category and used when the exchange rate arrangement does not meet the criteria for any of the other categories. Arrangements characterized by frequent shifts in policies may fall into this category. China is one country that has been categorized as a managed arrangement. The IMF is not saying it is floating or pegged, it is a mix of the two but it also does not really fit any of the other categories, so it has been categorized as a managed arrangement.

ASEAN ER Arrangements

These are the ASEAN exchange rate arrangements. The table showed the global distribution as of 2017. There are a couple of interesting observations. The de jure is what the countries themselves say they are. There are a few countries that the de jure is exactly as the de facto. In Brunei Darussalam, for example, the stated arrangement is a currency board and the de facto arrangement is also currency board. They are committed to the Singapore dollar. In Indonesia, the de jure arrangement is floating and so is

the de facto arrangement. The third column describes the actual monetary policy framework in place. In Indonesia, the monetary policy framework is the inflation targeting framework. This report does not have the same treatment with de jure/de facto exchange rate regimes to de jure/de facto monetary policy frameworks, but it is certainly the case that when a central bank says it is an inflation target, the IMF may or may not agree to a certain extent. A number of other countries deviate from the de jure, such as Laos, which states it applies a managed floating exchange rate regime, which is no longer an official de facto classification in the IMF. If a country states that it is a managed float, you know that that is a de jure classification because de facto does not fit in those categories. There is a managed arrangement but no managed float. Laos, Myanmar and Vietnam state de jure managed float but in practice, a couple of them are stabilized arrangements and in Myanmar's case, it is an 'other managed arrangement'.

Table 4.2. Exchange Rate Arrangement in ASEAN Countries

ASEAN Countries	Classification of exchange rate arrangements		Monetary policy framework
	De Jure	De Facto	
Brunei Darussalam	Currency board	Currency board	ER (SGD)
Cambodia	Managed floating	Other Managed Arrangement	ER (USD)
Indonesia	Floating	Floating	IT
Lao P.D.R	Managed floating	Stabilized arrangement	Other ¹
Malaysia	Floating	Other managed arrangement	Other ¹
Myanmar	Managed floating	Other managed arrangement	Monetary aggregate target
Philippines	Floating	Floating	IT
Singapore	Other managed arrangement	Stabilized arrangement	ER (composite)

Thailand	Floating	Floating	IT
Vietnam	Managed floating	Stabilized arrangement	ER (composite)

¹Includes countries that have no explicitly stated nominal anchor, but rather monitor various indicators in conducting monetary policy

What we see here is that for those authorities that deviate from the de jure, it is usually in the direction of a more managed exchange rate regime rather than less. Usually, the de jure will be closer to floating and the de facto will be closer to a peg. That is something I was a little bit surprised about because I live in Singapore. As of April last year, the de jure was other managed arrangements. Some of you may know that Singapore heavily manages its exchange rate, the Singapore dollar, against a basket of currencies. The authority has no specific level in mind, however, it is very opaque about the basket of currencies and the weights that it applies to each of those currencies. In Singapore, it is an exchange rate driven framework, from the objective to the intermediate target to the operational targets and so forth. Nonetheless, the de facto regime is a stabilized arrangement. This is, therefore, one example where over the preceding six-month period, the exchange rate did not move by more than 2%. The question that arises is against what? Here, it is relative to the de jure. Since the de jure is against a basket of currencies, this 2% limit is applied to that. Not the Singapore dollar against the US dollar, it is the Singapore dollar moving against a basket of currencies not more than 2% over the entire six-month period. Is it because of official action? Probably. Is it due to market conditions? Probably. It does not really matter and not really an issue. I think some countries, when there is discussion about this classification, will seem to see the IMF as punishing them. Almost as if the IMF has downgraded them to a less flexible arrangement but that is really not the issue at hand. The IMF is trying to have a standardized way of describing these exchange rate regimes across all countries in a way that there is a level playing field approach in place.

Interaction	
<i>Participant:</i>	Where does the classification of a managed float come from? If you say that it is more than a de jure/de facto thing, or at least the IMF does not use that classification, is it just because it sounds nice for a lot of governments to have it managed but floating?
<i>Speaker:</i>	The short answer is yes. In many cases, what we have found is that it is not a coincidence there has been a trend towards more flexible exchange rate regimes. In the eyes of the IMF, that has tended to be put on the good side of the liberalization story. In the context of where countries have moved towards more sophisticated monetary policy frameworks like inflation targeting, where a key criterion is a flexible exchange rate, they have basically said they are moving in that direction, the level is not important, stability is. Central banks want some fluctuation but not too much. A lot of this is just terminology as a way to fit the bill.
<i>Participant:</i>	I would like to know what the appropriate currency arrangement is for Timor-Leste if we left the US dollar to have our own currency. What is your recommendation?
<i>Speaker:</i>	I do not know enough about Timor-Leste to render an informed view on this. There are reasons why you may want to peg your currency to a major currency, like the US dollar. Usually, to the extent that you are pegging your currency, although in this case, you are not actually pegging, you are adopting the currency as a legal tender. Usually, in this sort of situation, you tend to see where there is a more geographical approximation between the

	two countries in question or, such as in the Hong Kong case, where there is a long history and also the role Hong Kong plays as a global financial center, I do not know enough about Timor-Leste to render a view about that.
<i>Speaker:</i>	It eventually depends on the preferences of policymakers. How much policymaking power do you want to give up by adopting a foreign currency as a legal tender? And how much do you maintain by having your own currency but then that requires you have to be a very disciplined in many other aspects. There is no clear answer but the pros and cons are clearly laid out. Timor-Leste is a resource exporter but you would give up monetary policy independence.
<i>Speaker:</i>	The ability to achieve domestic objectives is compromised. Did this happen recently?
<i>Participant:</i>	Timor-Leste achieved independence in 1999, when it adopted the US dollar as legal currency.
<i>Speaker:</i>	We will talk about the policy trade-off in the context of the trilemma and maybe there is something there that will be useful for you to incorporate into the Timor-Leste discussion.

A (Brief) History of Exchange Rate Arrangements

It is not that the world started in 1880, but it is far back enough in history for us economists to at least classify these periods with their own name. The classical Gold Standard of the late 1800s into the early 1900s, before World War I, was a period when capital mobility was quite rampant. Access to world capital markets, at the time, required most countries to peg their currency to gold. This map shows a one-shot period of 1910, namely the

latter period of the Gold Standard. It shows the distribution of all the countries with an exchange rate regime that pegs currencies to gold (shown in yellow). I took this from the paper written by Reinhart and Rogoff in 2004 as a critique of the IMF classification of exchange rate regimes but also as a way to capture, not just the classifications, but exchange rate regimes to the degree that they matter for macroeconomic stability and balances.

The Interwar Period (1918-1939)

Moving forward to the interwar period, most countries suspended gold convertibility during World War I. After the war, some countries returned to the gold standard, while others were forced to float. For example, fiscal pressures in Germany and Austria lead to hyperinflation and abandonment of the peg. This is an extreme example of how large fiscal balance can undermine the viability of an exchange rate peg. More recently, Argentina is another classic example where a large fiscal deficit/debt ultimately resulted in undermining the viability of the currency board arrangement. During the great depression, the gold standard became a constraint on the stance of monetary policy, mainly because of the trade-off issue. Countries were unable to maintain the peg to gold or adjust the policies towards accommodation to help exit from the great depression. It was a period when monetary policy was kept too tight. Economists have argued that the gold standard played a large role, in that context, in propagating and amplifying the crisis, which increased calls for new exchange rate arrangements.

The Bretton Woods Era (1945-1973)

Fast forward another 20 years to the so-called Bretton Woods era, post-World War II. Taking the same distribution, now there is a little bit more granularity, where, according to Reinhart and Rogoff's (2004) classification, there are still a bunch of yellow countries applying pegs to other major currencies but there is also the emergence of crawling pegs, as well as

managed, free-floating and free-falling exchange rate regimes. You will never see a free-falling exchange rate regime in IMF discussions. It is not fictitious, it is the definition used by Reinhart and Rogoff (2004). You would have to read the paper in order to understand what they mean. Simply put, when they wrote this paper, they focused really on the nexus of the choice of exchange rate regime and macro stability. What they found is that across countries and across time, the inflation rate was so high -in excess of 40% annually- that it did not really matter what exchange rate choices were made. The other macroeconomic fundamentals of the economy were so unstable that they overwhelmed the exchange rate regime's impact on macroeconomic stability. That is how they described freefalling. In 1960, only one Latin American country was classified under the free-falling regime.

The Modern Era (post-1973)

The modern era refers to post-1973. This is when we saw a variety of exchange rate arrangements in the context of considerable international capital mobility. At the end of the lecture, I put in a few slides that show a similar run through history in terms of capital mobility. You can see some correlation, sometimes negative, with the history of exchange rate regimes. This was a period where international capital mobility was rising. It was also a period of considerable experimentation with regimes but also recurrent exchange rate crises, especially in the 1990s, yet also in the context of the Latin American debt crisis in the 1980s. One observation here is that we have much less yellow, namely fewer pegged (crawling peg) regimes with many more managed regimes, including here in Asia. This snapshot is from 2010, so we are looking at the latter part of that period. Quite a few more countries have been included in the freefalling category by 2010. When inflation was in excess of 40% annually and the impact on macro stability overwhelmed the choice of the exchange rate. This period also coincided with the so-called Washington Consensus. The Washington Consensus refers to a set of free-market economic policies supported by prominent financial institutions, such

as the IMF, World Bank and US Treasury. The policies were backed and driven by the large economies of the world (G7) at the time, pushing for reforms and liberalization of economies around the world as a way to enhance trade, as well as global and regional growth. This happened in the late 1980s and early 1990s and was very much at the heart of the push for moving towards exchange rate regimes that allow for greater flexibility, if only for the need to have an exchange rate that can act as a shock absorber because this period coincided with the opening of the financial and capital accounts. The more open an economy is, the more susceptible it is to shocks. One way to absorb/mitigate/manage such shocks is to let the exchange rate act as a shock absorber through greater flexibility. Therefore, this period during the Washington Consensus was in the direction of greater exchange rate flexibility. Nevertheless, the recurrence of crises led to a lot more managed exchange rate regimes in the 2010s. The authorities liked the greater flexibility but were open to shocks and, therefore, wished to intervene more in order to avoid the additional costs/implications of rapid exchange rate depreciation. That is where we are today. We have a variety of regimes, ranging from free-floating to pegs, with most countries in the middle bucket where the exchange rate is more or less floating but managed or managed with more flexibility.

Broader Policy Framework

Let us now discuss the policy trilemma and the issue of capital mobility, focusing more in terms of fundamental dynamics, and less on the policy aspect. The choice of exchange rate regimes needs to be understood within the broader macroeconomic policy framework. In particular, how exchange rate regimes interact closely with two other policies, namely monetary policy and financial stability policy, including capital and financial account policies, which influences the degree of capital mobility. You need to choose your exchange rate regime and operate your exchange rate regime within the broader context of these particular policy frameworks. We also

know that the viability of any regime also depends on the sustainability of fiscal policy and the resilience of the financial sector to domestic and external shocks. Moving to the trilemma issue, when you choose an exchange rate policy, you have two choices: either peg the exchange rate or allow it to float. In your monetary policy, you can either have the freedom (autonomy) to adjust policy stance as needed to help achieve other objectives, for example price stability, full employment, or focus exclusively (no autonomy) on achieving an exchange rate target. I am being careful here not to say independent because that can elicit other issues. The third choice is capital mobility, either allowing the free flow of capital into and out of the country (perfect capital mobility) or adopting policies to restrict the flow of capital into or out of the country (imperfect capital mobility). When you are trying to figure out where you are in the spectrum of all these different policies, you need to ask yourself “could my monetary policy be considered autonomous?” Is there enough autonomy for the central bank to conduct monetary policy with an interest rate as a way to achieve objectives such as inflation? Yes or no? If yes, is there perfect capital mobility? If no, is there perfect capital mobility? You need to work through the three choices posed by the diagram, with each choice arc having two possibilities, so the permutations lead to eight outcomes. Where do you see Germany in terms of this diagram?

Interaction

Participant:

From a Bundesbank perspective, I would say we do not have monetary policy autonomy but the ECB has monetary policy autonomy, but the ECB is not Germany that is why I am saying it depends. In terms of Germany, I would say number 6 because there is not monetary policy autonomy but there is near perfect capital mobility and the exchange rate regime is floating. Therefore, the outcome is number 6.

<i>Speaker:</i>	As we can see from Germany's example, a monetary union makes things a little bit more difficult to ascertain but I would agree with number 6. Germany does not have a local currency to use in the conduct of monetary policy, it is using the euro, which is printed by the ECB. Germany may have a lot of say about how much of the euro to print but it is still being printed by the ECB. There is a lot of capital mobility in Germany and the currency in question, the euro, is floating, hence 6.
<i>Participant:</i>	In my opinion, I think the answer for Thailand is number 4. The Bank of Thailand is independent (autonomous) to conduct monetary policy. We also have capital inflow mobility with some restrictions. Our exchange rate policy is a managed float (closer to float than peg). Therefore, the answer is number 4.
<i>Participant:</i>	In the case of Turkey, I would say the answer is number 2. We have monetary policy autonomy, perfect capital mobility and a floating exchange rate regime. Therefore, number 2.
<i>Speaker:</i>	Using a very simple diagram, we have seen how to place a country's exchange rate policy, not its monetary policy. All we are doing here is talking about autonomous versus non-autonomous, we are not talking about inflation targeting, just the autonomy of monetary policy in this context.
<i>Participant:</i>	Is it possible for a country to change their regime or change capital mobility, say from fixed to floating, and what are the risks? Is it riskier to go from fixed to floating or from floating to fixed?

<i>Speaker:</i>	<p>The key question is what risks are we talking about? One risk is the variability in the exchange rate. Clearly, moving from fixed to floating will increase the risk of variability in the exchange rate. That is just one risk but then there are financial stability risks. Financial stability risks have more to do with the extent to which a financial system is exposed to large fluctuations in the exchange rate due to lending and borrowing in a foreign currency. Households and corporates may not hedge against foreign currency changes but be highly indebted. The exchange rate could suddenly depreciate due to greater variability and that would be a risk on the financial sector side. There are also policy risks. In terms of moving towards an inflation targeting framework, you want to move towards achieving price stability. Therefore, one question would be, by moving from fixed to floating, am I increasing the risk that I will not be able to achieve my domestic objectives, such as inflation or otherwise? In this context, one can argue that more variability in the exchange rate, which we now know is a precondition for the effective implementation of an inflation targeting framework, the less risk will be inherent in the move towards floating. The question really has to start with what risks we are looking at. Ultimately, it is really about how the central bank and government put weights on different risks, including financial sector, fiscal, monetary and so forth, and to then answer such a question in broad terms.</p> <p>As an example, before I came to Singapore I worked on Kazakhstan, which is an oil exporter. For many years, Kazakhstan maintained a pegged exchange rate regime</p>
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against the US dollar for similar reasons as Timor-Leste. Oil is priced in US dollars and exports are dollar denominated. Oil accounts for around 50% of GDP. Stability is important. Therefore, the currency was pegged against the US dollar. Notwithstanding, about four years ago the country realized that it really wanted to enhance the credibility of the monetary policy framework by adopting an inflation targeting regime. They had to ask themselves whether it was possible to adopt such a regime with a fixed exchange rate. The short answer is no so they had to look at the risks inherent with such a move. One risk was exposure to local currency fluctuations rather than US dollar fluctuations. There is also an initial risk because the IMF and others have said that the exchange rate was well overvalued (30-40%). This would trigger a large initial adjustment in the exchange rate. Then, there are the subsequent risks, including the financial sector, the fiscal side (dollar-denominated debt) and so on. All that needs to be taken into consideration but, ultimately, the borrowing in the financial system in a foreign currency was relatively low. The fiscal situation was not actually that bad because Kazakhstan rode the super-cycle of commodity prices through the early part of the decade, leading to a large fiscal surplus, low debt and very little foreign currency debt for the government. At the same time, the benefit of moving towards a regime that allowed the central bank to adopt interest rate-based tools to achieve its domestic objectives, like inflation, outweighed the risks. They ultimately moved in that direction but there was a big one-time adjustment in the exchange rate

	<p>(around 30%). Since then, it has basically been allowed to remain flexible, but is still managed a lot. It is very clear that the exchange rate management is about addressing volatility and not about addressing a level. Therefore, the IMF has kept classifying them in the floating category, sometimes moving to stabilized arrangements. This is a long-winded answer to your question, but it really does depend on the priorities and weights you put on these risks.</p>
<i>Participant:</i>	<p>When a currency is freely convertible, does it need to be associated with a particular exchange rate regime?</p>
<i>Speaker:</i>	<p>The short answer is no. You can imagine a fixed exchange rate regime or even a currency board that is fully convertible. The Argentinian peso was fully convertible but within a currency board arrangement. It happened to be unsustainable at that time but not because of a convertibility issue but because the currency board, in the context of broader policy and economic fundamentals, did not work out. Obviously, you could have a floating exchange rate and still allow for full convertibility. That move towards convertibility need not be associated with a particular exchange rate regime. For countries that are moving towards liberalization of the financial account more broadly, you see a more positive correlation between allowing more convertibility and allowing more flexibility in the exchange rate. In practice, that is true but is not a necessary condition.</p>

Impossible Trinity

Suppose your policymakers decided that they would like to achieve the following three objectives:

1. to stabilize an exchange rate;
2. to enjoy perfect capital mobility; and
3. having the freedom to conduct monetary policy to achieve domestic goals.

Robert Mundell developed an influential model in which he showed that those three choices are incompatible. Mandel's result has been called the **Impossible Trinity**. It is also referred to as the **Trilemma**.

In reality, if a central bank desires free mobility of capital and independent monetary policy, it will have to give up fixity, perhaps not complete fixity in the sense of managing the exchange rate but certainly on a hard peg. If a hard peg or fixed exchange rate is desired, along with perfect capital mobility, independent monetary policy would not be possible.

Perfect Capital Mobility

We are not going to go through Mundell's seminal work but I will provide a nice simplification which can illustrate the trade-offs and why there is an impossibility between those three policy choices. A key concept in Mundell's analysis is perfect capital mobility. When we talk about capital mobility in Mundell's context, what we mean is perfect capital mobility. It does not refer to partial capital mobility. We are referring to perfect capital mobility. There are two components of perfect capital mobility: (i) capital flows are unimpeded into and out of the country with no restrictions; (ii) the notion of substitutability between the assets of the home and foreign countries. By definition, when the IMF is talking about perfect capital mobility (PCM), we say no restrictions on the movement of capital AND perfect substitutability between the domestic and the foreign assets to which the foreign currency has been pegged. In essence, the second feature of PCM is important because it means that sterilized intervention is ineffective.

Interaction	
<i>RBI:</i>	Sterilized intervention is when you intervene to sterilize the monetary consequences of the intervention through sales of government securities or whatever. Essentially, you are nullifying the monetary impact of intervention in the forex market.
<i>Speaker:</i>	You care about the level of the exchange rate, you intervene and simultaneously you do something that at least makes your inflation not move much. In practice, it will be a combination where the central bank buys or sells foreign currency but because that will have implications on domestic currency liquidity depending on whether you are buying or selling the foreign currency, this will have implications on the interest rate that you are trying to manage and, therefore, you would act in the opposite direction to ensure that that interest rate does not change. In the context of perfect capital mobility, the second feature of substitutability implies that sterilization is ineffective.

Why Countries With A Peg Cannot Have Independent Monetary Policy?

Under perfect capital mobility, we start with the uncovered interest rate parity condition (UIP), which is the difference between the local and foreign interest rates, as reflected in the expectation of the exchange rate. The domestic currency would therefore be equal to the foreign currency + a variable (expectation of the exchange rate changing from today until a future horizon). In the context of UIP, a peg implies that there is no change in the exchange rate. By definition, it is a peg. Therefore, the domestic currency at time, t , must be equal to the foreign currency at time, t . What would happen if policymakers wanted to move the domestic currency? Let us suppose that

the central bank wished to loosen monetary policy by lowering interest rates relative to the foreign interest rates. Under perfect capital mobility, that would induce capital inflows. Since it is a peg, however, that the central bank wishes to maintain, it would sell foreign currency and drain (decrease) domestic currency liquidity. The decrease in domestic liquidity would increase i_t , bringing interest rates back into line. Therefore, it would not be possible to lower the interest rate while maintaining the peg and PCM. That is it in a nutshell. In this context, sterilization to defend the peg would basically not be effective since by assumption, there is perfect substitutability between the domestic and foreign assets in this world of perfect capital mobility. Consequently, the central bank would not be able to achieve sterilization while maintaining the peg and allowing capital to move freely. Vice versa, if the central bank wanted to tighten monetary policy, it would induce capital inflows. To maintain the peg, the central bank would buy foreign currency and increase domestic currency liquidity. The increase in domestic liquidity would reduce i_t , bringing interest rates back into line. Therefore, it would not be possible to raise the interest rate either. This is a very simplified analysis but it is an important illustration of the trilemma.

Why Countries With A Peg Cannot Have An Independent Monetary Policy?

Under imperfect capital mobility, we can use the augmented uncovered interest parity relationship, which adds the term, w_t , where w_t is a risk premium that can vary over time. Imperfect substitutability of assets or capital controls may create such a risk premium. By definition, we are basically imposing a constraint on the substitutability assumption inherent in the original relationship. In that case, the scope for sterilized intervention to be effective in maintaining the peg depends on its power to alter the risk premium. Essentially, what the risk premium does is break the link between the domestic and foreign interest rates. We know that in reality, there is a risk premium. In the world of emerging markets and developing countries, in the context of this interest parity condition, there is a risk premium. In essence,

therefore, there is a lot of mobility of capital but the presence of the risk premium helps the central bank break that link and, hence, be more effective in its sterilization.

Mundell's Key Result

If you want the benefits of free capital mobility, then monetary policy is going to have to choose between stabilizing domestic prices and/or domestic output (domestic objectives) and stabilizing an exchange rate. The corollary is that if you are willing to accept imperfect capital mobility, then it may be possible for monetary policy to seek domestic objectives and sterilized intervention to stabilize its exchange rate.

Do Countries That Peg Give Up On Monetary Independence?

Obstfeld, chief economist at the IMF, Shambaugh and Taylor (2005), wrote a paper where they basically looked at the historical pattern of exchange rate regimes using the trilemma story to see whether you can, in fact, ascertain or explain the trilemma in the context of different exchange rate arrangements (Obstfeld, et al., 2005). They took a relationship between the change in domestic interest rates and the change in foreign interest rates and tried to estimate α . The idea was that under Mundell's results with a pegged exchange rate and perfect capital mobility, domestic interest rates must move 1:1 with the short-term interest rate for a country that is pegged to that foreign currency. In the case of a pegged exchange rate and perfect capital mobility, $\alpha = 1$. If you have perfect capital mobility and you want to maintain a peg, by definition your domestic interest rate is fully dependent on the foreign interest rate. The hypothesis was that $\alpha = 1$, which they tested across regimes and through history. For countries that float, $\alpha = 1$ is not necessary. Indeed, under floating, complete independence of monetary policy could yield $\alpha = 0$. This is the idea that your domestic interest rate has nothing to do with what is happening abroad. We know in reality that that is never really

the case, especially for emerging markets but also for countries that are developing their capital market and integrating globally. Foreign interest rates, like in the US, do matter for domestic rates. In practice, $\alpha = 0$ would never happen but as you will see $\alpha = 1$ also does not really happen in practice. High correlations (α close to 1) were seen as suggesting little monetary policy independence and low correlations (α near 0) were seen as suggesting more independence.

Table 4.3. Difference Regression of Interest Rate on Annual Data

	Gold standard		Modern era	
	Peg	Non-peg	Peg	Non-peg
α	0.52**	0.05	0.46**	0.27**
R2	0.41	0.00	0.19	0.01
Observations	350	140	748	1.103

Source: Obstfeld, et al. (2005)

Results

When Obstfeld, et al. (2005) looked at pegged and non-pegged countries in the modern era as well as pegged and non-pegged countries in the gold era, they found that countries that pegged were more constrained by foreign interest rates, namely less monetary policy autonomy or α closer to 1, than countries that do not peg. That is consistent with the other findings, namely high correlations (α close to 1) were seen as suggesting little monetary policy independence and low correlations (α near 0) were seen as suggesting more independence. Looking at peggers to non-peggers in the same era, α was higher for the peggers in both eras and lower for the non-peggers in both eras. For example, in the modern era, α was estimated at 0.46 for pegged and 0.27 for non-pegged. Not 0 or 1 but certainly higher, meaning less monetary autonomy for peggers. During the Bretton Woods period, even though pegging was so widespread, there was quite a bit of monetary autonomy, consistent with the view that capital controls (prevalent at the time) can break

the link between monetary policy and exchange rate policy. Remember, imperfect capital mobility has a risk premium element that can break the link even though α itself may be closer to 1 because you happen to be in a more pegged regime environment. What the researchers also found was that non-peggers responded more to changes in foreign interest rates in the modern era than during the gold standard. What might explain that? Previously, we were basically comparing pegs to non-pegs within the same era, now we are comparing the non-peggers in the modern era to those in the gold standard era. The finding is that non-peggers in the modern era had an α closer to 1 or greater than the non-peggers in the gold standard era. What might explain that? Between pegs and non-pegs it is due to the trilemma. The short answer, which touches upon the next discussion about China, is that in the modern era, there is a global central bank phenomenon, where, as a non-pegger (floater), your α should be closer to 0 but the reality is that because of integration of capital markets and the rapid evolution of financial products across borders, domestic interest rates, especially in smaller countries and emerging market countries, are very much influenced by the decisions made by the ECB, US Federal Reserve, Bank of Japan and so on. We are not talking about pegged versus non-pegged, we compare the two eras and make a case that this phenomenon of capital flow globalization and the impact it has through the decision-making of large central banks, can explain this diversion.

What About Limited Capital Mobility?

China is often cited as pegging an exchange rate (not a hard peg, de facto other managed arrangements), having an independent monetary policy but having less open capital and financial accounts. Yet differences in monetary policy relative to the US have led to big swings in reserves and capital flows. In fact, accommodative monetary policy since 2008 in the US has contributed to large capital inflows and reserve accumulation in China. More recently, expectations of policy normalization in the US since 2014 and

policy accommodation in China have resulted in a large drainage of reserves. These sharp movements in capital flows are still an issue even though it is a case of less capital mobility and an environment where the trilemma does not fully apply. China's experience shows that limited capital mobility may allow for independent monetary policy and some control over exchange rates but not without potentially significant implications for reserves. In a given year, total equity capital (FDI and portfolio investment) in and out of China amounts to around USD5 trillion. That is a lot, making it sound like an open capital account with plenty of capital coming in and going out but in reality, as a percentage of GDP, it is only around 40% of total GDP of USD 11 trillion. In advanced economies, it is around 1.5 times GDP on average, which is three times that in China. In terms of financial openness, Lane Milesi-Ferretti (IMF staffers) developed the IFIGDP Index, which adds up all the flows in and out and divides that by GDP. Before was just equity, now we are looking at the total, including other investments, debt instruments, equity and everything together. In China, the index is about 1, but in the US, UK, Germany, it is more like 4 or 5. China has had a lot of capital coming in and out in recent years but it is not as open as it may appear. In terms of reserves, there was an accumulation up until 2014, before a sharp decline. China reached a peak of USD4 trillion in reserves by 2014. China has since lost about USD1 trillion in reserves as of early 2016. It is still a lot of reserves but a lot of reserves have been lost at a time when the central bank had to move to an accommodation of its interest rate, when the US was actually signaling, and has now started, to hike interest rates. This resulted in a large net outflow of capital, which translated into a sharp fall of reserve assets. This is an example of a country where there is not perfect capital mobility but that facilitates independent monetary policy and interest rates in relation to achieving domestic objectives, while caring about exchange rate stability. In some sense, solving the trilemma is not an objective in and of itself. Ultimately, the authorities may be able to operate around the trilemma in the context of imperfect capital

mobility but there are other things happening. China, which is subject to large capital inflows and outflows, can find itself in a situation where despite more favorable operation around the trilemma, it can be subject to shocks and these sorts of outcomes.

Figure 4.1. China: Benchmark Rates

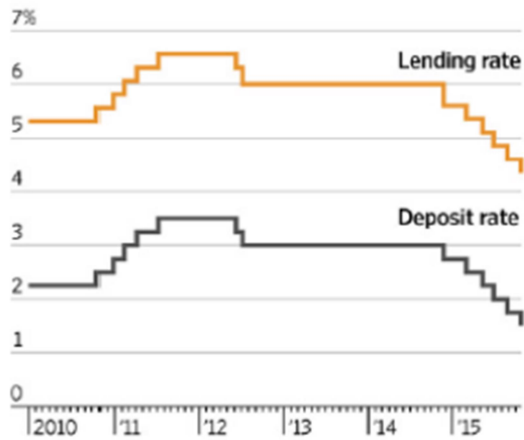


Figure 4.2. China: International Reserves
(USD billions)



Source: People's Bank of China via CEIC Data

Takeaways

The exchange rate regime is a key part of a country's macro framework (monetary, financial, and fiscal). The taxonomy of regimes is rich and evolving, and there is no consensus on the best way to classify regimes, much less on the best regime. Exchange rate volatility appears to be a concern for some policymakers, which is reflected in their reluctance (fear of floating) to let exchange rates float freely and perhaps also the disconnected between de facto and de jure exchange rate regimes. At the same time, capital mobility can have an important influence on the feasibility of monetary policy autonomy under pegged ER regimes, especially when operating under imperfect capital mobility.

The objective was not to find the right exchange rate regime or the best one, it was to give you an overview about regimes and classification and how to think in the broader context of monetary policy.

Interaction	
<i>Participant:</i>	Could you quickly elaborate on what other managed arrangements are and why do we need that? Are the other classifications not already rich enough?
<i>Speaker:</i>	The short answer is no. The precise definition of each classification is not rich enough. Hence, there is the residual. It is basically a regime that when you look at the way the central bank intervenes (frequency and magnitude) in the exchange rate, the volatility of the exchange rate, the stated objectives and so on, you cannot fit the regime into any of the other categories, therefore it is other managed arrangements. One interesting example from this region is Malaysia. As of last April (2017), reflecting the previous 6 months (October 2016 - April 2017), Malaysia was applying a de jure floating ER regime under a stabilized arrangement. It then moved to other managed arrangements but why? One of the reasons Malaysia is in that category is because it is in the process of moving towards adopting an inflation targeting monetary policy framework, except that the policy objectives are not stated explicitly. The central bank says it cares about price stability and has a target in mind but it is implicit. The mere fact that it is implicit and not explicit puts it into that category, independent of the other factors.

	<p>It is not meant as a judgment, it is meant as a factual observation that has to be standardized across all countries.</p>
<i>Participant:</i>	<p>In 2016, Malaysia had trouble with its currency. Is that why it was classified as other managed arrangements due to the controls implemented by Bank Negara Malaysia?</p>
<i>Speaker:</i>	<p>Capital control measures do not enter the picture here. They enter into the Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER) in a big way, but the exchange rate regime is very well contained and well defined, independent of restrictions on capital mobility. It may be that the trouble in Malaysia led to actions in the exchange rate, including the implicit objectives that made the IMF move Malaysia to the other managed arrangements. It is adjusted every year.</p>
<i>Participant:</i>	<p>Is there any interconnectedness between the monetary trilemma and the financial trilemma, which contains financial stability, integration and prudential policy? Is the trade-off just in terms of policies?</p>
<i>Speaker:</i>	<p>Ultimately, they are in the same spirit but using different policy tools and objectives. They are both in the same spirit of policy trade-offs, namely that you have to give up the achievement of one objective and the attainment of that particular policy in order to achieve other policy objectives. The trade-off is in terms of policies but ultimately, it is also in the outcomes for the attainment of the objective you have in mind. In the context of the central bank policy mix, Indonesia is very much at the forefront globally of thinking about monetary policy more</p>

and more in the context of financial stability and financial policy, not just, for example, thinking about macroprudential policies to address financial stability issues but how to use macroprudential policies in the context of achieving objectives under inflation targeting that have formally just used the interest rate as an intermediate operational target to achieve. There is a lot of open debate about this. There is a lot of empirical work and literature on leaning against the wind, of letting interest rates rise as a way to cushion the blow on the financial sector. This is the next stage of how we think about implementing financial sector policies to achieve conventional monetary policy objectives, such as inflation. Those trade-offs are very much inherent in that particular discussion.

5. Managing Capital Flows

Yoke Wang Tok

Introduction

This chapter will focus on a more comprehensive version of the IMF's institutional view and how it has evolved as well as different types of CFMs for managing inflow and outflow, summarizing from all over the world along with some case studies. I will also talk about the effectiveness of capital flow measures as well as the effectiveness of macroprudential measures (MPMs).

Capital flow management measures (CFMs) refer to measures that are designed to limit capital flows, comprising of residency-based CFMs and other CFMs. Other CFMs do not discriminate on the basis of residency but are nonetheless designed to limit capital flows, for example currency-based MPMs and other measures typically applied to the non-financial sector. Prudential regulations and capital controls can help to reduce the build-up of vulnerabilities on balance sheets and the emergence of credit booms. This lecture has been a summary of the background paper on liberalizing capital flows and managing outflows (March 2012) and the institutional view.

IMF And International Capital Flows

The IMF was formed in a different time than now. The IMF was established after World War II in 1947 solely to manage the Bretton Woods system and to help countries manage their exchange rates. In terms of capital flows, the IMF has no jurisdiction. We have some rules for the current account but not the capital account. That is the whole gist of this. There is no global framework on capital flows. We have existing frameworks, mainly regional and bilateral, with limited considerations for macroeconomic stability or the impact on global stability. The OECD Code on Capital Flows is legally binding, but only for OECD member countries. The IMF mandate

on the capital account is more limited. There is a current/capital account asymmetry. The history in the IMF shows that there was a period of time when the IMF realized the current/capital account asymmetry so there was some thinking about changing it; of giving the IMF more say over the capital account. By the second amendment of the IMF Articles of Agreement, therefore, there was more recognition of the role of international capital movements in the international monetary system. In the 1990 reform effort, the IMF wanted to do more to introduce the obligation of members to liberalize the capital account, which was interrupted by the Asian crisis. The initiative to make IMF more powerful and look at the capital accounts was halted. Then came the global financial crisis 10 years later. Until today, there have been no changes in the IMF Articles of the Capital Account. That is where we stand now. The 2007 and 2012 Surveillance Decisions really dealt with the exchange rate. Remember, the IMF's first mandate was on exchange rates, namely to make sure there was an orderly movement of exchange rates. The 2007 Decision was actually about assessing how far exchange rates were from the fundamentals, using what we called the EBA approach.

This is a summary of the articles. There is Article VI, Section 3 on the controls of capital transfers. Remember that IMF has jurisdiction over the current account, therefore, we restrict members from putting controls on payments for current transactions. At that time, after World War II, the global economy was in very bad shape and needed rebuilding. Consequently, IMF was promoting international trade. At that time, capital flow mobility was very low. We restricted payments for current transactions. There is also Article IV, which requires members to ensure orderly exchange rate arrangements. Finally, Article VIII requires members on restrictions of current payments and to avoid discriminatory currency practices and multiple currency practices. There was nothing on the capital account.

The Fund Developed An Institutional View On Capital Flows

This is how the Fund's institutional view on capital flows has evolved. Remember how reforms were halted because of the Asian crisis? The G20 called for a need for a view from the IMF and this was prompted by the global financial crisis and the fact that we are now in a different time where capital flows are very high and many countries have opened up their capital account. From 2010, there was paper on capital flows. The right-hand side of the slide summarizes the papers done by the IMF from 2010-2017. By 2012, we had our paper on the institutional view. All the papers are referenced and are full of case studies about different country experiences. The institutional view guides policy advice, building on country experiences. This was done during the Article IV consultation. This is not binding and there are no implications on the members' rights and obligations. The institutional view merely guides advice and strengthens multilateral collaboration. I must stress that having the institutional view does not change the members' current obligations, especially under Article VIII on current payments and so on.

Before we started the lecture on the types of capital flow management, we asked whether capital flows are considered good or bad? Most of participant have chosen maybe as the answer. Would anyone care to elaborate?

Interaction	
<i>Participant:</i>	It depends on several factors. The savings-investment gap means we do need inflows, for sure, consisting of foreign direct investment as well as portfolio investment. The major portion is portfolio investment because it is very easy to move, for example in Europe from the core to the peripheries or from advanced countries to emerging markets. The problem is when the capital flows are excessive.

<i>Speaker:</i>	There is no right or wrong answer, it is just your opinion. Later, I will show you how capital flows have benefits and risks and I will show you what the threshold conditions are you need to get to before you can reap the benefits of capital flows. Of the people in this room, nobody thought that capital flows were bad, most people are sitting on the fence and a few of you said capital flows were good. My next question is, “would you fully liberalize the capital account in your country?” Most of you are saying no. As central bankers, you are cautious, which is good. I would like to ask both yes and no people why?
<i>Participant:</i>	From a German perspective, as a credit exporting country, I think it is vital for the economy to enable capital in and outflows, whatever the economic actors may think is best. With respect to emerging markets, I can absolutely understand why not to fully liberalize at this stage.
<i>Speaker:</i>	You are fully developed in terms of the market, so you are able to intermediate the flows very well. When did Germany open up its capital account?
<i>Participant:</i>	Presumably with the deepening of the European Monetary Union in the 1980s.
<i>Speaker:</i>	Do not think that developed countries have no problems and can just liberalize. They do it at a certain stage when they are much more mature. In China, we asked them this question: “if tomorrow, you fully liberalized what would happen?” The answer was simply “impossible”. This is a good mind game to play; to ask yourself what this scenario would be like. If you suddenly opened up tomorrow, what would happen? Would there be an

	immediate crisis? It depends on a lot of factors. We have had Germany's perspective but what about the majority who said no?
<i>Participant:</i>	I think some amount of capital control is necessary, without being too strict. Soft capital controls are required, especially for emerging market economies, like India or for that matter Indonesia. Some capital control is okay.
<i>Speaker:</i>	Only one person said maybe. Perhaps they have not made up their mind. We now know what your views are on capital flows.

The Fund's Institutional View

The Fund's institutional view is a summary and consolidation of global comparative experience. Capital flows can have substantial benefits, otherwise why would countries open up? However, it also carries a lot of risk, even for countries that have long been open. The benefits of capital flow liberalization can be achieved if countries reach certain thresholds of financial and institutional development. It is not just financial development yet also institutional development. If you asked me about the thresholds, I would give you four things. Financial market development. There are studies that look at stock market cap to GDP, credit to GDP. Institutional development is more difficult to measure but the World Bank has some indicators on institutional quality and governance in terms of bureaucracy and corruption. There are two other things. First, macroeconomic policies, which is most important. Remember, we said that this is the first line of defense so you can measure it by how many deficits you run, such as fiscal balance to GDP, degree of trade integration (imports + exports / GDP). These are some of the indicators. There are papers that summarize just the fiscal balance and trade integration and you get an index. You weight them together and you get an index and then you take the median. The median of this across countries is

the threshold. It is not the most perfect method but it is how you can get a threshold if you take a base of 189 IMF member countries. Some of these indicators are not available. Some studies just look at fiscal balance to GDP as well as exports + imports to GDP. If you meet the median threshold, the median comprises both developed and developing countries, you are more likely to reap the benefits of capital flows. Liberalization needs to be a well-planned, timed and sequenced. That is easier said than done but that is the whole idea. Before you open up, you have to do a lot of things in the background to strengthen yourself and make sure you have a fiscal policy that is not unsustainable, for instance. Institutional structures must also be in place along with a good monetary policy framework and a credible central bank. Most people think that the IMF says every country should fully liberalize. That is not the goal. Contained in the institutional view paper there is no presumption that full liberalization is an appropriate goal for all countries at all times. That is just to clarify the myth about the IMF's view. There is no one-size-fits-all solution.

We know there is a lot of risk and we have seen crises happen after capital inflow surges and sudden stops. Rapid capital inflow surges can pose risks for macroeconomic and financial stability and create policy challenges. Therefore, appropriate policy responses are required for both recipient and source countries (inflows and outflows). The key role needs to be played by macroeconomic policies and sound financial supervision and regulation as well as strong institutions. Only when fiscal, monetary or macroeconomic policy space is limited, capital flow management measures (CFM) can be useful. We must exhaust all policy options first before resorting to capital flow management measures. CFMs are no substitute for the right macroeconomic policies.

Just to give a flavor of the policy challenge, I would like to ask another question about whether you would raise or lower rates in a scenario where strong inflows in your economy have led to overheating pressures. How

would you stop the strong inflows? Out of the group, only one person said raise rates. Could anyone else tell me why they would lower rates?

Interaction	
<i>Participant:</i>	Investors would come to a country that offers a relatively high yield. Therefore, the interest rate differential matters. When the condition is like this and we anticipate a potential reversal, the rates should be lower. If we raised the rates, it would attract greater inflow.
<i>Speaker:</i>	Could the one person who would raise rates tell us why? She said as a macroprudential measure but macroprudential measures may not be good for overheating. I did not say what type of overheating. It could be inflation going very high so you will need monetary policy. I did not say what else was happening in the economy under this scenario but just this small scenario shows you that it can be quite complicated when there are capital inflows and your economy is overheating. When CPI is growing very strongly, if you lowered rates in view of the capital flow, you might risk higher inflation and it also does not guarantee that the flows will stop because they may be drawn by other reasons, not just the interest rate differential but perhaps a lot of push factors from advanced economies. Sometimes, lowering the rates may not help. That is why people resort to capital controls. That was just a small exercise to show you the dilemma that can arise from capital inflows or outflows.

CFM Terminology

Capital flow management measures (CFMs) refer to measures that are designed to limit capital flows, comprising of **residency-based** CFMs and other CFMs. Residency-based are always CFMs. If it is currency based, then it could be CFM or MPM. That is the terminology we use. Residency-based CFMs discriminate between residents and non-residents and are always CFMs by virtue of their own design. Other CFMs do not discriminate on the basis of residency but are nonetheless designed to limit capital flows, for example currency-based MPMs and other measures typically applied to the non-financial sector.

Types Of CFMs

There are different types of CFM. Controls can take the form of taxes, price or quantity controls. The most recent trend has been to limit short-term capital flows, which are the most unstable, because of their potential destabilizing effect. Controls are seen as second-best solution to the destabilizing effects of volatile capital flows due to imperfectly regulated local financial systems and/or imperfect capital markets. Nevertheless, sometimes volatility of capital flows is not enough to justify capital controls or to justify a tax on the flow of capital, which could lead to distortions. Therefore, it is more of a last-resort measure in most cases.

1. Managing Capital Inflows

We have measures to limit inflows and measures to limit outflows. This slide shows you in the institutional view where these three circles (exchange rate, reserves, economy) intersect, which is where you have no more options or policy space because the economy is overheating, there are adequate reserves but the exchange rate is overvalued. Remember, if you lower rates, the option is not available because lower rates will overheat your economy, which is very problematic. In that case, you would implement CFMs.

Considerations for using CFMs. Under certain circumstances, CFMs can have a role in supporting macro policy adjustment and safeguarding financial system stability during an inflow surge or when the capital account is prematurely liberalized. CFMs should not be implemented pre-emptively before an inflow surge. There must be a strong inflow surge for a sustained amount of time, above the historical average (median). In terms of implementation, CFMs should seek to be targeted, transparent, temporary (being lifted once the surge abates) and non-discriminatory (non-residency-based).

2. Managing Capital Outflows

Again, CFMs should only be implemented at the intersection of the three circles, when the economy is in crisis or imminent crisis.

Considerations for using CFMs. I think countries find this very hard to follow because CFMs are only implemented once a crisis is imminent. That is the whole debate about this, namely whether it should be more pre-emptive. CFMs to be used only in crisis or imminent crisis situations or when the capital account is prematurely liberalized as part of a broader policy package that addresses the fundamental causes of the crisis. Outside of (imminent) crisis situations, there is normally scope to adjust macroeconomic and financial sector policies to address the outflow-related implications. In terms of implementation, again CFMs on outflows should be transparent and temporary, being lifted once crisis conditions abate and seek to be non-discriminatory. Furthermore, implementation may need to be comprehensive.

Interaction	
Participant:	Capital flows can be good but most countries aim for longer term like FDI or debt flows that can finance the real sector. Portfolio inflows seem to do more harm than good

<i>Speaker:</i>	<p>due to the volatility, and I was just wondering if the IMF has any room for pre-emptive CFM? We have a holding period as an anti-speculative measure. Is that allowed?</p> <p>On the whole, the IMF does not say whether something is allowed or not, we just provide some comments. I cannot say whether it is allowed or not because this view is rapidly evolving so you may even see changes this year or next year. Even the OECD is revising its Code on Capital Flows. A lot of things are happening and they may soften their stance on this. IMF has come a long way from during the Asian crisis when they said no to capital controls but after the global financial crisis they are saying yes to capital controls under certain conditions. To me, IMF is coming to terms with this as well. For both sides, it is a learning process.</p>
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Capital flow measures include price controls and quantity controls. The types of price controls to discourage short-term capital flows are a tax on foreign exchange transactions that reduces the incentive to switch positions over short horizons and exchange rate volatility. Brazil has done this on short-term equity and fixed-income flows. The second type of price control is a mandatory reserve requirement on short-term deposits from foreign residents or borrowing from foreign residents. This is clearly a CFM. Having a reserve requirement increases the cost of borrowing to discourage that kind of flow. The idea is that someone seeking a short-term loan would have to leave a deposit at the central bank of 30% and earning no interest. Many countries have done this, including Thailand. Have any other of the countries represented here implemented an unremunerated reserve requirement? No? I will show you some examples later.

Capital flow measures also include quantity controls. A common one is placing a ceiling on how much foreign residents can borrow. There can also be administrative controls on cross-border capital movements; regulations on the portfolio choice of institutional investors; limits on the amount of money firms can invest abroad and limits on the transferring of profits abroad. Indonesia has implemented a one-month holding period on bonds.

Measures To Limit Inflows

Brazil introduced a 2% tax on portfolio equity and debt inflows in 2009 at the height of the financial crisis when Brazil was feeling a lot of pressure. This led to a lot of circumvention. Indonesia imposed a 6-month holding period on central bank bonds and a limit on short-term foreign borrowing by banks to 30% of capital in 2001. This is more of a quantity control. Peru increased the fee on non-resident purchases of central bank paper to 400bps from 10bps in 2010. Thailand restored a 15% withholding tax on non-residents' interest earnings and capital gains on new purchases of state bonds in 2010. South Korea restored a 14% withholding tax on interest income on non-resident purchases of treasury and monetary stabilization bonds in 2011.

Measures To Limit Outflows

Thailand imposed limits on forward transactions and introduced exports surrender requirements in 1997. Nevertheless, when Thailand did this, it was already too late. It should have been much earlier. Malaysia is famous for using capital controls to bide time during the crisis and imposed a 12-month waiting period for non-residents to convert proceeds from the sale of Malaysian securities in 1998, amongst others. Argentina established Corralito, which limited bank withdrawals and imposed restrictions on transfers and loans in a foreign currency in 2001. Banks in Iceland failed and the value of the currency declined by more than 30% so Iceland stopped the convertibility of domestic currency accounts for capital transactions in 2008.

Ukraine introduced a 5-day waiting period for non-residents to convert to local currency proceeds from investment transactions to a foreign currency.

Case Studies

Indonesia

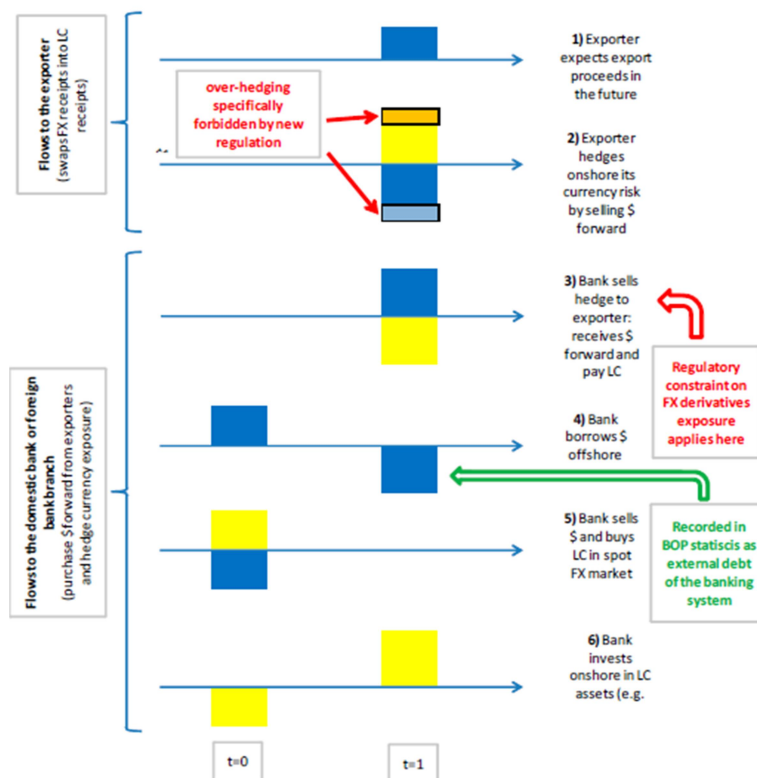
Authorities in Indonesia have implemented CFMs since 2010 when there was an inflow surge on the back of strong macroeconomic performance, which complicated liquidity management and lead to excessive fluctuations in bond yields and the exchange rate. At that time, Indonesia was amassing a current account surplus. Furthermore, Indonesia introduced a minimum holding period of one month on central bank bills (SBI) for both domestic and foreign investors. Bank Indonesia also placed limits on the daily balance of banks' short-term external debt to 30% of capital. The reserve requirement on deposit accounts in foreign exchange was raised to 5% from 1% and in June 2011, the reserve requirement was raised to 8%. Finally, the loan-to-value (LTV) ratio was eased for residential mortgages to counter a slowdown, which is a macroprudential measure. Indonesia experienced a messy outflow in May 2013 triggered by the Taper Tantrum after a prolonged inflow. The Taper Tantrum was caused by then Governor, Ben Bernanke, announcing a slowdown of asset purchases, which caused a major reaction in the markets. There was massive withdrawal of portfolio flows from Indonesia and other emerging markets, including South Africa, and Brazil and so on. Indonesia, amongst others, had to do a lot to manage the fallout from the Taper Tantrum. With the benefit of hindsight, everything went well. Everyone did a good job managing the outflows.

South Korea

South Korea is famous for having huge foreign currency exposures. The banking system has been heavily reliant on wholesale funding, including from abroad, and prone to the pro-cyclical build-up of leverage that creates

persistent vulnerabilities to changes in global funding conditions. This actually happened during the global financial crisis. The build-up of external liabilities was driven in part by speculative demand for currency forward contracts by the corporate sector (shipbuilders) on expectations of KRW appreciation. Following the GFC, South Korea experienced a large sudden stop of capital flows (short-term external bank flows, outflows from local equity and bond markets). Consequently, onshore banks and foreign bank branches were unable to roll-over maturing short-term external debt due to large exposure to US dollar borrowing. The Bank of Korea reacted promptly to provide FX liquidity by drawing on reserves and through the Fed swap lines. Another 12 countries also signed swap lines with the US Federal Reserve, some of which were more pre-emptive in nature and never activated but South Korea actually had to draw on the swap line in order to prevent an imminent crisis. It was a scary time, when we thought the whole world could collapse. There was a massive shortage of US liquidity. The South Korean authorities also took longer-term measures to reduce vulnerability of capital flows but also imposed many capital controls during that period.

Figure 5.1. Foreign Exchange Hedging by Exporters



This chart explains why the South Korean economy was so prone to having short-term foreign borrowing in the banks. Blue represents US dollars and yellow represents Korean won. Above the line means positive cash flow and below the line means negative cash flow. In Korea, there are a lot of shipbuilders, which is a long-term endeavor. Shipbuilders expect their US dollar proceeds to come in much later ($T+1$). At that time, because the Korean economy was doing well with massive inflows, they expected the Korean won to appreciate. Therefore, in expectation of that, they entered into forward contracts to sell US dollars forward and buy won in order to realize large profits, leading to over-hedging. They hedged more than they needed and it became speculative. A lot of companies are like that and some companies go down because of that. There are many cases. In Singapore too.

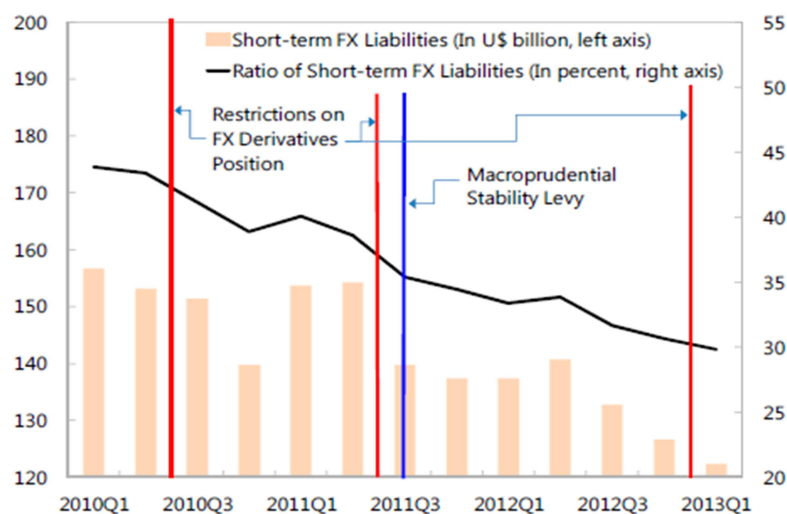
The Korean shipbuilders took this position of selling US dollars and buying Korean won. Consequently, the banks had to take the opposite

position. In the spot market, the banks borrowed a lot of US dollars, onshore and offshore, for arbitrage. Then they sold the US dollars to buy Korean won and to benefit from the interest rate differential. This seemed such a good way to make money. The South Korean banks chalked up a lot of external debt/foreign currency debt. When the global financial crisis hit and global flows reversed, they were in big trouble and imposed the following measures. In June 2010, South Korean authorities announced a package of measures to reduce excessive short-term external borrowing, requiring banks to raise their long-term FX borrowing from 80% to 90% (later raised to 100%) of their long-term FX lending (November 2009). The authorities then imposed a leverage cap on banks' FX derivatives positions in June 2010 and a levy on non-core FX bank liabilities in April 2011. By then, however, it was already a bit late but South Korea did not enter a full-fledged crisis thanks to these measures. South Korea also restored a 14% withholding tax on interest income on non-resident purchases of treasury and monetary stabilization bonds, leading to equal treatment for both foreign and domestic investors.

Interaction	
<i>Participant:</i>	Were there any obligations for exporters to provide underlying transactions for export proceeds?
<i>Speaker:</i>	There was no need to provide underlying transactions. Shipbuilders and anyone else for that matter could easily just go into speculative positions in anticipation of debt or appreciation. The lesson from South Korea is that they really learned a lot from this and the measures introduced were effective, not fully effective because some were circumvented. The measures prevented a full-fledged crisis. South Korea introduced a whole package of measures to reduce FX exposure.

FX derivative positions and related short-term external borrowing have fallen as FX hedges became more expensive, but FX hedges have moved offshore and external inflows have shifted to other sectors. The measures in South Korea appear to have lengthened the maturity of capital flows, thus helping to reduce maturity mismatches in the banking sector. Not all measures in South Korea were fully effective due to circumvention. This chart is a sign of how effective the short-term FX levy was in South Korea. The authorities also imposed a complex macroprudential stability levy, which is available to read about in their asset report. This was also meant to curb the exposure to FX liabilities. I think some of the measures are still in place. Even households in South Korea like to get into FX positions along with credit card debt and so on. So even households in South Korea are leveraged, not just the corporates. South Korea also has quite a lot of macroprudential measures in place, including this one to constrain the behavior.

Figure 5.2. Short-term Foreign Exchange Liabilities



Brazil

Brazil is another example of extensive use of capital controls, especially after 2019, which was somewhat effective but also circumvented. Instead of an unremunerated reserve requirement, Brazil taxes financial

transactions, mostly portfolio flows, including both equity and fixed income. In 2011, the authorities also imposed an unremunerated reserve requirement (URR) on the banks' gross FX liabilities in order to limit the circumventing of such taxes on flows with offshore operations. Furthermore, a tax on corporate foreign borrowing of less than 1-year maturity was extended to maturities of below three and, later, five years. This was meant to lengthen the maturity of the borrowing. The URR in Brazil and also in Colombia were heavily circumvented due to sufficiently developed derivatives markets, so some of the transactions moved offshore. Consequently, Brazil had to introduce more measures. You will see a lot of similar stories from Latin American countries because they have their fair share of inflows and outflows and crises. I have cited the paper by Baba and Kokenyne (2011), so you can see the effect of the controls, whether they reduce the volume of the net flows, alter the composition of inflows, reduce real exchange rate pressures or increase the interest rate differential. I will not go through every case but please refer to their paper.

Table 5.1. Effectiveness of Capital Control Policies in Selected Emerging Economies in the 2000s

Country	Measure	Effect of controls			
		Reduce the volume of net flows	Alter the composition of inflows	Reduce real exchange rate pressures	Increase interest rate differential
Brazil (2008:Q1–Q3)	1.5 percent tax on foreign exchange transactions related to fixed-income investments	No	No	No	Yes
(2001–07)	Outflow liberalization	No, but increased long-term outflows	No	No	No
Colombia (2007:Q2–2007:Q4)	40 percent, six-month URR on foreign borrowing and portfolio inflows; two-year minimum stay	Yes	Yes(for 1-3 months)	No	Yes

Country	Measure	Effect of controls			
		Reduce the volume of net flows	Alter the composition of inflows	Reduce real exchange rate pressures	Increase interest rate differential
	requirement for FDI; limit on banks' gross derivative positions to 500 percent of capital				
Korea (2004–08)	Outflow liberalization	No, but increased long-term outflows	No	No	No
Thailand (2006:Q4–2008:Q1)	30 percent, one-year URR on foreign borrowing and portfolio inflows;	Yes (through increasing outflows)	No	No	No
	Outflow liberalization	Yes (through Increased outflows) 1/	No	No	Yes
	Other inflow controls	No	No	No	Yes

Source: Baba & Kokenyne (2011)

Effectiveness of Macroprudential Policies to Stem Inflows and Reduce Credit Growth

In summary, there have been mixed results. In some cases, a tightening of macroprudential measures, such as in Croatia (2003 - 2007), South Korea (2008), India (2007) and Peru (2007-2008) contributed to a reduction of credit growth. In others, for example Colombia (2007), it did not. Brazil and Colombia are good examples of where the unremunerated reserve requirements were heavily circumvented, which led to the introduction of other measures, including macroprudential measures targeting credit growth. The macroprudential measures appear to have lengthened the composition of capital flows in Croatia, Peru, Romania and Uruguay. However,

macroprudential measures have contributed to financial sector resilience. Measures taken in Croatia, South Korea and Peru have lengthened the maturity of capital inflows and reduced maturity mismatches in the banking sector.

Regarding the measures, dynamic provisioning means more provisions when credit growth is high (good times). Marginal reserve requirements are additional reserve requirements on anything you lend and limits on banks' gross derivative positions in conjunction with unremunerated reserve requirements. These are all considered macroprudential measures to reduce credit growth but there was no strong effect on credit growth overall but some effects in specific sectors. Croatia introduced a speed limit, meaning that if credit growth increased to a certain threshold, say 30%, the banks would be required to stop lending. The speed limit taken in Croatia effectively reduced credit growth and unhedged foreign borrowing but MRR had no strong impact. Prudential measures reduced FX lending and lengthened the maturity of capital flows but had no effect on asset prices.

Summary

My whole lecture has centered on capital controls. The institutional view of the IMF is that capital controls cannot substitute sound macro policy and good financial regulation because that is needed for any economy, whether there is capital account liberalization or not. If you want to attract the right kind of flows, you better have the right kind of policies. That is the whole idea. Countries should first exhaust their macro policy options before implementing capital controls (or prudential measures that act as controls) as a last resort. We know that capital flows complicate macro policy management. Do you raise rates or not? Do you tighten fiscal policy or not? In cases where you have not been very prudent or the policy mix has not been very consistent, meaning you run fiscal deficits all the time, where do

you get the space to expand fiscal policy when needed? Where do you get the money to support your economy? We know that prudential regulations and capital controls can help to reduce the build-up of vulnerabilities on balance sheets and the emergence of credit booms but they both inevitably create distortions. MPMs can help to strengthen resilience and reduce credit growth. When inflows/outflows are largely intermediated through the regulated financial system, prudential tools can be the main instrument. Oppositely, when inflows/outflows bypass regulated markets and institutions (for example, because domestic entities borrow directly abroad), prudential regulations will have little traction and capital controls may be the only option. CFMs on inflows tend to be more targeted but CFMs on outflows need to be more comprehensive. This is because there are also a lot of loopholes and you are trying to prevent the circumvention by plugging the loopholes. Usually, the measures are done on the banks because firms are not under your jurisdiction, such as restricting their net forex open position to x% for example.

In terms of the references, have a look at the background paper on liberalizing capital flows and managing outflows (March 2012). This lecture has been a summary of mainly these papers and the institutional view. There are also papers on the multilateral aspects of policies affecting capital flows with a focus on source country policies.

To close, I would like to ask whether you think the IMF should regulate capital flows and most participants have said no. Anyone care to elaborate?

Interaction	
<i>Participant</i> (No):	I think it is because the circumstances of capital flows are country specific and it should, therefore, be up to the countries to decide but perhaps the IMF could give guidance.

<i>Speaker:</i>	<p>Who said yes? Who thinks the capital flows are too messy and wants somebody to police them? There are people who are thinking about it but I do not know whether it will happen. Who said yes? Should the IMF regulate capital flows? By that I mean even changing the Articles of Agreement or passing a decision. In the IMF legal framework, amending the Articles is very cumbersome, it requires a lot of work. Just like quota reforms, it requires around 75-80% of the countries to vote for it and then requires every parliament to ratify it. That is for quotas, but I think the Articles are also at that level. Nonetheless, if you think the IMF should regulate capital flows, IMF can pass a decision like the 2007 Surveillance Decision, where they go and try to label countries whether they are fundamentally misaligned, whether they are manipulating their currencies and so on. That is possible. I am thinking more in those terms of passing a decision.</p>
<i>Participant (Yes):</i>	<p>I answered yes because you put “regulate” in quotation marks, so in my mind it is more about stronger recommendations and stronger suggestions rather than just recommending countries adopt certain regulations on capital flows. Perhaps that is not regulating <i>per se</i> in every law in every country, but it is important to make sure that all the countries have a fair playing field in terms of capital flows.</p>
<i>Speaker:</i>	<p>I think that is about right. Some believe that there must be some kind of global consensus or coordination about capital flows because it has wreaked havoc on the economy. Strengthening regulations and supervision as well as deepening the financial markets takes time. Be</p>

careful where this goes. If you regulate or proscribe too much, you may just limit the overall pie. There are pros and cons. At some point, that will become discriminatory. What types of flows do you try to control and what impact would that have on the development of domestic financial markets?

FINANCIAL STABILITY AND MACROPRUDENTIAL POLICY

6. Financial Stability and Systemic Risk

Julie Kozack and Rajan Govil

Introduction

This chapter will discuss the financial stability and systemic risk. Financial stability is a situation where the system can continue to work so that economic activity continues without any restrictions or hindrance. A stable financial system works efficiently and effectively, which can be sustained in the face of macro and micro vulnerabilities. Financial stability is probably better defined as a situation where you do not have a crisis. Perhaps it is easier to define financial instability than financial stability. The first thing I would like to talk about is financial stability. I will also talk about systemic risk and balance sheet linkages.

Systemic risk is a risk that the entire system collapses or has problems. It is not only one individual bank collapsing, it is a number of banks, which could perhaps impact the debt market, stock market, insurance companies and others. It is the system-wide risk of a collapse or contagion within the system. It is important to manage systemic risk, which is related to the procyclicality element, and it is important to make sure the loans are going to the right people and that systemically important banks are being taken care of. It is the reason why balance sheet linkages are very critical.

Financial Stability

As you have already mentioned, financial stability is the absence of system wide episodes in which the financial system fails to function. It is probably easier to define what financial instability is, which is situation where things may not work. There are two aspects to financial stability. One is that economic activity continues without any problem and for that the financial systems required to mobilize savings into investment. Second, that

financial stability is very important for the conduct and transmission of monetary policy. If there is no stable financial system, how can the central bank transmit its monetary policy? If a central bank raises interest rates that might not follow into lending rates or anything. That is what you are trying to avoid. Financial stability is desirable both for economic activity as well as for the transmission of monetary policy. That is what financial stability is all about, you are able to move savings to investments without a problem.

Financial Development Vs. Financial Stability

The key issue is that financial development is not just credit growth. Do you think that is true or false? Is financial development just about credit growth or is there something else?

Interaction	
Participant:	The point is that if you have excessive credit growth, it can lead to all kinds of bubbles in the system. Many times, there is a situation where there is credit growth, but it does not get into the right kinds of activities. What I am trying to say is that credit growth is an indicator of demand but, at the same time, excessive credit growth can also lead to financial instability.
Speaker:	Absolutely right. Excessive credit growth could be a problem and lead to overheating. I will talk about credit-to-GDP gaps and credit growth later. Here, what I am trying to get at is that credit growth is not the only thing we should look at in terms of financial development. There are other aspects of financial development that are also important for a country, which would include bond market development because that is also for intermediation (not only bank credit), perhaps stock market development. That is really what I am getting at

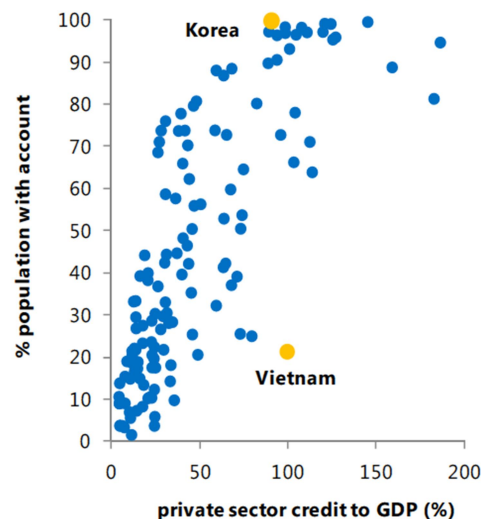
and you are absolutely right, bank credit still remains the most important part of financial intermediation in most economies. In the US, for example, in 2007/08, if you just measured and looked at bank credit growth, it was not necessarily as high, whereas intermediation in the financial markets was much higher. Traditionally, when we have looked at financial development measures, we have looked at bank credit to GDP or bank credit growth as measures, but we should not ignore other indicators, such as stock market and bond market development, along with mutual funds, pension funds, insurance funds, and so on. There is a whole plethora of financial institutions that are important for financial development and it is not only about banks. You are absolutely right, however, to the extent that bank credit growth is very important and a very important indicator. In many of our countries, including Indonesia, bank credit is the main channel of providing money from savers to investors, although the bond markets and equity markets have become important also, especially bond markets. I can see many of you are very young here but for those of you, especially not from Indonesia, Indonesia did not really have a domestic debt market until the Asian crisis. Indonesia's domestic bond market was developed only after the Asian financial crisis, starting in the early 2000s. Before that, Bank Indonesia played the role of issuing its own bills. Indonesia is another country that has developed its domestic bond market and the stock market has become more vibrant than it was. That has to be accounted for but if you were just looking at bank credit growth, you

are ignoring another part of financial development, which is happening. That is why when we look at financial development, we need to look at various aspects, not only credit growth.

Financial Access And Depth

Another aspect is financial access. Do people have access to the financial system? Comparing two Asian countries, in the case of Vietnam, for example, financial access is around 25%, so around 25% of the adult population has access to bank deposits and so on. Whereas, in the case of South Korea, almost the entire population has access to the banking system and has bank deposits or deposits in the banks. That is another aspect to look at that we typically ignore in most studies of financial development and growth.

Figure 6.1. Financial Access vs Depth



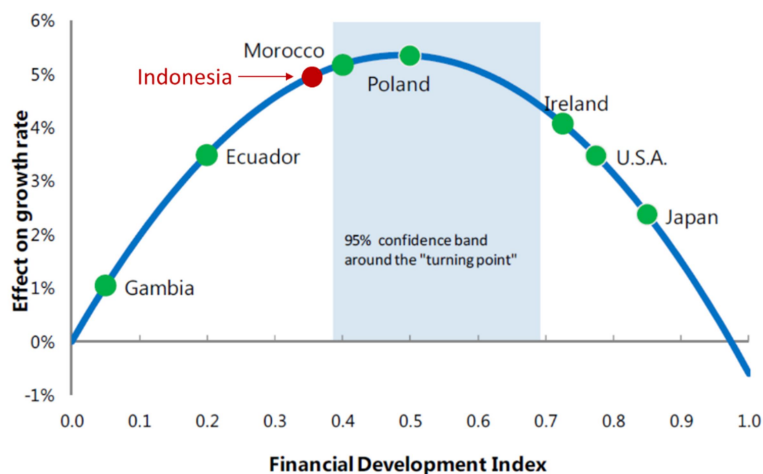
Source: Sahay, et al. (2015)

Financial Development And Growth

To get around this, there was a paper written in 2015 by a team of IMF economists and they basically created an index of financial development

(Sahay, et al., 2015). That index of financial development depended on the depth, efficiency and access of each of these sectors of the financial sector. For example, they broadly categorized the financial system into the financial institutions (largely the banking system) and the financial markets (bond and stock markets) and they rated the development of each of these aggregated indicators to get some sort of financial development index. When they looked at the financial development index and GDP growth, what they found is that as financial development increases, at the initial stages, it has a positive impact on GDP growth but after a certain point in time, which depends on country to country, the impact on GDP growth is much more limited. That is what their financial development index points to. Why do you think it is that initially a country benefits a lot but later on not as much? In an underdeveloped economy, during the initial stages, the financial system, which includes the banks and the financial markets, are underdeveloped. If that starts to develop, it will have a positive impact on economic growth initially because you are able to mobilize the savings and channel them into investments, which you were not able to do earlier. Remember, this is a system where the banking system is not very well developed. As you continue to do this, however, there is a limit and the argument of the authors is that after a certain amount of time, the productivity and efficiency of the additional capital tends to decline. That is what causes the economic growth impact of this higher financial development to go down. You are still able to get the savings and accumulate capital, but the capital efficiency decreases. Financial development is very important and it can vary from country to country but, by and large, there is a relationship that says in the initial stages, financial development is very healthy and good for economic growth but beyond a certain point, like marginal productivity, it tends to decline. That is all we are trying to say.

Figure 6.2. Financial Development and Growth



Source: Sahay, et al. (2015)

Interaction

Participant: Is it possible that financial development has a negative impact on growth?

Speaker: Over time, the impact of financial development on growth declines. If the line goes below the horizontal axis, growth would be negative. This is possible even initially because if the system is developed, that could lead to a crisis due to a lack of proper monitoring and regulation.

Participant: I think this is a contentious issue. There are a number of studies that show no 1:1 relationship between financial development and growth. It is generally understood that when a country is at a very low level of financial development and it initially opens up its financial sector, you generally have growth. The relationship is not that well-established, however, that financial development certainly leads to growth.

Speaker: You are right, it depends on country to country and the reason for that is because typically, financial

	<p>development... How many countries are you aware of that develop the financial system and have high economic growth? How many countries are you aware of that have had high economic growth without the development of the financial sector? I cannot think of any countries for the second question, where a country could have high growth on a sustained basis without financial sector development.</p>
<i>Participant:</i>	<p>If you look at China and, for that matter, East Asian economies, prior to the East Asian crisis and before the global financial crisis, China did not have a very developed financial sector. Similarly, the bond markets in East Asia were not developed prior to the global financial crisis but these countries were a classic example of export-led growth.</p>
<i>Speaker:</i>	<p>No, you cannot look at it that way because you have to look at the indicators. Firstly, those studies are looking at credit growth only. This study is looking at a broader picture. Secondly, it is not correct to say that the Chinese financial system was not well developed. There were weaknesses but in terms of the total credit share to GDP in the system, it is very well developed and the Chinese debt market, for example, is one of the largest in the world. I think the debt market is the second largest in the world currently. Even earlier, the debt market was very large but trading was not allowed. Therefore, the debt market in China has been very large as well. The debt market may not have been very well developed in China but they were borrowing a lot externally. Externally, therefore, total private sector credit and government sector credit (borrowing) was USD150 billion. That is a huge amount.</p>

	<p>We are not talking about the banking system. It is not correct to say that the financial system was not developed in Southeast Asia.</p> <p>It was developed but the economy was less developed. As a country keeps developing, it is important to develop both of them. I definitely cannot agree with you that the Chinese financial system was not developed prior to the crisis on the basis of numbers.</p>
<i>Speaker:</i>	<p>The Chinese had a plan to fully liberalize their capital account by the year 2000 but that was halted because of the Asian financial crisis. They did not fully liberalize their capital account, especially after the massive outflow experienced in 2015-2016. They have backtracked a bit and tightened some of the controls, on outflows especially, but they have never given up on full liberalization. The plan is still on the way. Even without a fully liberalized capital account, China has the third largest bond market in the world, the second largest stock market in the world and the largest credit market in the world. Therefore, by its own massive self, it has been growing so large.</p>
<i>Speaker:</i>	<p>Just to reiterate, it has not been small. It has been fairly large. By the way, the decision to open up the capital account and fully liberalize was taken in 1993. They went back on that to a certain extent because of what they saw in the 1997 Asian crisis but they started liberalizing again later on.</p>
<i>Participant:</i>	<p>Perhaps a good example of the negative side is the recent global financial crisis. The financial market in the United States is so developed that you can almost have financial</p>

<i>Speaker:</i>	<p>contracts on everything, including credits and mortgages. The crisis and the contagion effect and the way the crisis spilled over was faster in the developed financial markets.</p> <p>Absolutely right. Another thing that happens is that if a country develops its financial sector quite rapidly, what happens is that some of the best talent tends to move away from the real sector to the financial sector, which is one of the reasons for the argument that the productivity of capital tends to decline overtime because in the real sector you do not have that talent. A lot of it moves to the financial sector. That is one of the arguments, it is not the only argument. Again, country-specific factors could be different but what this research was saying is that beyond a certain point of financial development the benefits to growth may become weaker. It is not saying that it is negative. As our colleague from Turkey pointed out, a lot of these countries could just have crises and that itself impacts the growth rate.</p>
<i>Participant:</i>	<p>Did the study also identify prerequisites for this relationship to happen, like a certain financial depth or certain level of liberalization? What are the pre-requisites so that this works, namely the relationship between the index and growth?</p>
<i>Speaker:</i>	<p>There may be many factors impacting this. This is just an opening, where this particular slide not only looks at bank credit as an indicator of financial development but looks at all other indicators and finds this relationship after controlling for various factors. There could be many explanations for this. In terms of identifying any kinds of</p>

thresholds, it does not do that for individual countries. There are some case studies of countries mentioned, like Malaysia, Chile and so on but it does not go on to identify because for every country the situation will be very different. There are no individual, specific country thresholds. Every country is very different, and countries are evolving over time. From what I remember, in Germany the stock market was extremely small prior to 1990. In fact, the bond market was not very large either. Most of it was bank lending. In the US, it was very different. The stock market was very large and the bond market was very large. Conditions are continuously evolving and you have to look at what is happening. The only other thing that this paper says is that if you increased financial deepening very quickly, you could run into trouble and that is principally because you may not be able to regulate or supervise the kinds of lending, you may not have the right institutions, there could be asymmetric information so you do not know who your borrower is because you want to lend very quickly. From a banking system perspective, financial deepening means that the credit increases much faster than GDP growth. In other words, credit-to-GDP rises. The problem with that is the banks are not well-equipped to be able to assess risk but they are lending very quickly, which will become non-performing loans later that will hold back growth because later on the banks will have to provide capital. This paper is saying that growth volatility tends to increase if the pace of financial deepening is too fast. Similarly, inflation could also be impacted, yet not to the extent that growth is.

Finally, if the financial system is deepened with rapidity, the risk of crisis tends to rise faster. All of these are natural. If you are lending too fast, financial development is too fast and the growth is not happening, how will people be able to repay the loans? Underlying economic growth is required along with growing incomes to repay those loans. If you are giving too many loans but people's income is not rising, how will they repay the money?

Basically, there is some sort of a trade-off between financial development and growth after a certain point. Initially, as the financial system develops, it is positive for growth but beyond a certain point, it could become a problem, mainly because the financial flows may not be as productive. Secondly, there could be a trade-off between the pace of financial development and financial stability. If you develop the financial system too quickly, are you able to maintain financial stability because those loans may not have gone to the right people? Are you going to get those loans back or not?

Interaction

Participant:

The relationship between the volatility and the percent change of financial institution depth is positive for the first two charts, namely growth volatility and inflation volatility, but negative for distance to distress. Could you elaborate more about the trade-off between financial deepening and stability?

Speaker:

If you deepen your markets too fast, which means that you are providing loans at a much faster pace, what could happen globally is that the loans are made to the wrong people or bubbles could appear or the economy might overheat later on and so those loans could become bad. If

	<p>you deepen to fast, the distance to distress, meaning the chance of having a crisis very quickly, increases. Those are separate graphs.</p>
<i>Participant:</i>	<p>You mentioned the trade-off between financial development and growth. In my opinion, I think it might not be a trade-off, I think that perhaps the financial development will not be able to support the economic growth at a certain point of time because economic growth may rely on functional and other sector development itself rather than financial development. At this stage, we need a policy to balance financial development and economic growth, which may be a combination of monetary and fiscal policies.</p> <p>Regarding the second trade-off between the pace of financial development and financial stability, I also do not think this is a trade-off. Financial development and financial stability can go along together with careful policies and observation from all agencies of the financial institutions, so that they can develop their financial system along with sustainability and financial stability with economic growth. Trade-off implies a choice for the policy, that we have only one choice to use but I think we also have a choice to minimize and also we have the choice to combine policies together.</p>
<i>Speaker:</i>	<p>Thank you for your comments. I think they are extremely important. My initial comment would be that I do not think you really have a choice. It is your job to manage financial sector development. You do not have a choice. Let us be very clear about that. If you had a choice, the</p>

	<p>system would blow up anyway. That is your job, right?</p> <p>First, you have to look at potential growth. Does anyone know what potential growth is in Indonesia? Do you think potential growth is going to be impacted by financial development?</p>
<i>Participant:</i>	<p>There is a gap between potential and real growth. Potential growth is the optimum growth that we can achieve.</p>
<i>Speaker:</i>	<p>Potential growth is the level of growth you can achieve given your resources. In a very traditional sort of sense, hopefully potential GDP is growing over time. Potential GDP basically depends on the amount of labor and the quality of labor, the amount of capital and total factor productivity (TFP). Actual GDP contains fluctuations and the difference between actual and potential GDP is referred to as the output gap. If potential GDP growth depends on capital, what determines your capital? It is the machinery and buildings you have, which are going to be impacted by investments. How do you attract investments? Through savings, right? Let us concentrate on domestic savings because, typically, in most countries, foreign savings are a very small part of total investment. It is crucial for savings to be intermediated to investment, for which you need financial sector development. Therefore, financial sector development is going to be very important. All I am saying is that the trade-offs are caused when financial system development is not proper in the sense that it leads to financial instability. Then, there could be an impact on growth. If you want financial development, you could open up all sorts of banks. If we</p>

look back to 1993-94, the capital required to open a bank in Indonesia was around USD1 million. In other words, the banks were not well regulated. It was financial deepening but it led to financial instability and had a huge impact on growth. To that extent, there would be a trade-off. One is not saying that you have to choose between the two. One is saying that if you develop it too fast, without the proper institutions, without the proper regulatory structure, without the proper supervision, without taking into account asymmetric information, you are going to run into trouble.

Regarding the second part, namely the trade-off between the pace of financial development and financial stability. You do not have a choice, you have to have financial development. To have that financial development, you need to ensure that the financial system remains stable.

Returning to foreign savings, this relates to the saving-investment gap. Let me assure you, nobody is going to invest money without a banking system. First, you need intermediation. That is all I am saying. By the way, the FDI in every country is typically a very minuscule part of investments in the economy. Investments in Indonesia account for about 25-30% of GDP and FDI is only a very small part of that. I think the investment rate in India is also around 25-30% and FDI is barely 2-3% of GDP but that FDI is all financial flows, so you do not know how much of that will contribute to investment. Therefore, you really need your domestic savings to be channeled into investment. For that, financial intermediation and financial development are extremely important, whether you like it or not. We can discuss the causality either way but the point is we have to remember that there is no country in the world which has grown on a sustained basis at high rates of growth without a financial sector being developed. That is something you need to keep in mind. When I say there is a trade-off between financial development

and growth and financial stability, all I am saying is that we need growth and financial stability but we also need the financial sector to develop in such a way that it does not create problems for growth or for financial stability.

That is the first part. Financial stability is important, financial deepening is important and growth is important but you have to make sure there is not so much financial deepening without bothering about the supervision, regulation and how it is going because that will have a negative impact on growth and financial stability.

Systemic Risk

What do we understand about systemic risk? Systemic risk is a risk that the entire system collapses or has problems. It is not only one individual bank collapsing, it is a number of banks, which could perhaps impact the debt market, stock market, insurance companies and so on. It is the system-wide risk of a collapse or contagion within the system. That is what you do not want.

Dimensions Of Systemic Risk

One is the time dimension, how aggregate risk evolves over time, and pro-cyclicality. What is pro-cyclicality? Pro-cyclicality basically means that as the economy grows, then credit grows, they move together, and as the economy contracts, credit also tends to contract. That is fine but problems can occur because the credit growth can actually amplify the problems. For example, suppose you would like to buy a house in the United States that costs USD100,000. Banks, typically banks in Asia, will ask you to put some money down in order to get a certain loan to value (LTV). If the loan to value is 80%, the bank would pay USD80,000 and the borrower would bring in the remaining USD20,000. Therefore, if you bring in USD20,000, you get USD80,000 but what happens if you buy the house for USD100,000 and house prices rise by 30% in one year? The value of the house is therefore USD

130,000. If you sold that house now, you would receive USD 130,000 but how much would you have to repay to the bank? USD80,000. It is simple arithmetic. You are left with USD50,000 after putting in just USD20,000. It is a clear profit of USD30,000. By investing USD20,000 for one year, you are going to make USD30,000. Do you have any of those deals available in Indonesia, where you put in USD20,000 for one year and get a profit of USD30,000? Of course not. Now, imagine another situation in the US before the crisis. The house is worth USD100,000 and the bank offers USD110,000, which is what the banks were doing but why? Are they crazy? Why would a bank offer USD110,000 against a house that is worth USD100,000? What were the banks expecting to happen? How would they get their money back? The banks were expecting house prices to continue rising. If a bank lends you USD100,000 and the house price goes up to USD120,000, without putting any money in, you are getting USD20,000. If that is going to be the situation, what is everybody going to do? Everybody is going to get a loan and buy a house because they know house prices are going to rise and they will make money.

Going back to our earlier case, you put in USD20,000 and borrowed USD80,000 from the bank. Then you sold the property for USD130,000 and made USD30,000. Now, instead of the property increasing from USD100,000 to USD130,000, imagine it goes from USD100,000 to USD70,000. What would happen if the house is sold? You have sold the house for USD70,000 but would still need to repay USD80,000 to the bank. If you are unable to pay back the money, it would become a non-performing loan. The more leverage that is provided by the banks, the more risk people are willing to take on, which is what was happening before the financial crisis. In fact, it happens most of the time, even before a crisis. That is the pro-cyclicality element. When house prices actually fall or asset prices fall, you will incur huge loss, rendering you unable to repay the loan, neither the principle nor the interest to the bank and the banks are going to have a non-performing loan. When the banks have many such non-performing loans, they are not going to be able to

function as a financial system. That is the time dimension. As the economy is doing well, house prices are going up as people are taking more and more loans. Sometimes, the loan quality starts to worsen and that can create problems.

The other part is the structural dimension, namely how risk is distributed in the system at a given point in time. This relates to asymmetric information. The banks may be lending to the wrong people, which could lead to problems. As a bank, if you do not have sufficient resources, you will be unable to repay to another bank, which can create problems for the other bank. That is the structural dimension. There are common exposures across institutions leading to externalities, including direct exposures to similar asset classes and indirect exposures through counterparty relationships.

In the US, in 2008, when the crisis really broke out, one of the first things before that was that in March 2008 there was a big investment bank (Bear Stearns) that failed and it was bought by JPMorgan. The Lehman Brothers debacle came much later. Lehman Brothers did not have enough funds to pay other counterparties because the loans they made had become bad. Consequently, the counterparties looked elsewhere to borrow but who would lend to them? Typically, in the system, the various banks are engaging in transactions to lend and borrow from each other continuously every nanosecond. Imagine if a bank suddenly did not have the money, no one would want to lend to that bank. In this kind of a scenario, credit freezes up in the financial system. No institution is willing to lend to anyone else. No institution trusts the other institution because you do not know whether the banks are solvent or not. The only institution that can come to the rescue is the central bank because it can effectively print money. This was a similar sort of situation that Bank Indonesia found itself in 1998. Bank Indonesia acted as lender of last resort (LOLR) and a lot of high-powered money was created to bail out the banking system, which led to other consequences. The basic fact is that if there is a freeze-up in the credit and nobody is willing to

lend to anybody, how will economic activity take place? Consequently, economic activity will completely stop. That is when the central bank has to step in and support the banks. What the US Federal Reserve did was to purchase their assets and provide them the liquidity. A key policy question is how to limit the joint failures of institutions that represent a significant portion of the system? You have to be careful that the banks are not taking direct exposures to similar asset classes and so on.

Time Dimensions Of Systemic Risk

The financial sector could be lending to households, corporations or the government and if any part has a problem, it would impact the entire system. By the way, when Lehman Brothers happened, it hurt me as an individual. The reason why it hurt me was because I used to keep my cash in money market mutual funds and one of the best money market mutual funds used to be called the Reserve Fund. It was the first money market mutual fund in the US. It so happens that they also held some Lehman Brothers bonds that became zero in value. The way a money market mutual fund works is that its value is always equal to 1. Therefore, the government agencies froze all accounts, meaning that nobody could take money out. This meant that I could not withdraw any cash. Until then, the money market mutual fund was considered just like a bank account. Therefore, it hurts everyone. If the financial sector has a problem, it is going to impact households. There could also be runs on the banks as customers try to withdraw their deposits because they are scared that the bank might fail. Households can affect corporates and vice versa. There are also linkages to the rest of the world.

Another crisis that had its offshoots in the US was Greece. In the case of Greece, the government had borrowed a lot of funds and they were borrowing from international and domestic banks. When people realized that Greece might not be able to repay its obligations, international banks started

pulling money out. When the international banks started pulling money out, the value of Greek bonds in the international market decreased. If the value of the bonds has gone down and one of the entities that typically holds a maximum amount of government bonds is the banking sector, so the value of the assets in the banking sector also goes down. Consequently, bank solvency comes into question. As the Greek banks are having problems, in terms of shrinking asset value, the banks' customers are going to withdraw their deposits. Therefore, in Greece, the banks are being hit both on the asset side and on the liability side because their deposits are being withdrawn. All of this is happening because of what has happened in the government sector, which is related to what is happening in the rest of the world.

If you are in Asia and there are foreign banks operating in Asia, if the banks to which those countries belong, say Spain, is in trouble, the Spanish banks operating in Indonesia are going to withdraw their funds. That will have an impact on Indonesia. All of this is interconnected. If a sector has a major problem, it will affect everyone.

Interaction	
<i>Participant:</i>	Our financial sector is developing so we are now focusing on the stock market. Before 2009, we had high GDP growth (7-8%) but after the GFC, intermediate growth declined to 5%. From 2009 to 2012, credit to GDP was increasing rapidly and the credit was also very high. Before that, non-performing loans were low but afterwards, NPL increased rapidly.
<i>Speaker:</i>	Before the global financial crisis, Vietnam was growing very rapidly along with very rapid credit growth, most of which was going into the real estate sector where prices were going up. This is happening in most Asian countries. Joint stock banks were set up in Vietnam, typically with

state-owned enterprises setting up banks. They were lending to the real estate sector and when the crisis hit, the growth rate went down and real estate prices initially plummeted, with the result that a lot of these banks experienced an explosion of non-performing loans. That is a legacy issue even today in Vietnam because there is a huge amount of non-performing loans that the government is trying to deal with through an asset management company. They are still dealing with that situation 10 years later. The point I am trying to make is that all of these things are interconnected. The problem is that the Vietnamese banks had at that time, -now they find it difficult to extend loans to the corporate sector because they are relatively weak. I hope you understand that any one sector which has a problem can lead to problems across the financial sector. Therefore, it is important to be cautious.

A Feedback Loop between the Macro Economy and Financial Markets

The interactions between the financial system and the real sector can be mutually reinforcing. Through leverage, the relationship becomes even more related. For example, when the economy is doing well, real estate is doing well, the banks tend to lend money. When the banks lend money there is greater demand for assets and asset prices increase further. Seeing asset prices increase, people borrow even more, and that increases the procyclicality or increases the relationship between the macro economy and financial markets. In contrast, when the financial markets do badly, that has a serious negative impact on the macro economy. We are still trying to understand, model and quantify these linkages but I do hope you get the gist

of it that because of the laws you are making, you could have trouble across the wide spectrum, including households, the corporate sector and government. It is important to improve policymaking, therefore, and reduce the frequency/costs of crises.

Links between Finance and Macro Economy

The financial sector can be an amplification mechanism for macroeconomic shocks (including policy shocks) because you can borrow more and there is always financial innovation. One of the things I did want to mention was that supervisors and regulators are always behind innovation. It is not easy; it is a tough job. The financial sector can be a source of shocks and sometimes crises. The financial sector can also be a source of information about agents' expectations on macroeconomic variables. For example, if you compare the rates on treasury inflation-protected securities (TIPS) and standard bonds, you can figure out what the inflation rate is.

In the US, 10-year bonds are currently about 2.8%. A German tenured bond is about 0.5%. The differential between the two is 2.3%, which could indicate that risk is lower in Germany but what if they both had an identical rating? Concerning the macro economy, the differential could tell us that inflation expectations are lower in Germany but there is something else. The differential is also telling us about the exchange rate, namely that the US dollar will depreciate on average by 2.3% over the next 10 years. That is what the market is telling us. Furthermore, that is something that you can actually trade. Therefore, the market can provide a lot of information as well, whether it is true or not in the end is another matter. There can be a lot of information in the markets. People can argue differently but, in reality, this is a rate that can be traded.

1. Amplification Channel: Bank Funding

As a colleague from Vietnam mentioned, in 2008/09, US interest rates went down dramatically. In fact, global interest rates went down and because of that the bank funding cost went very low. Therefore, banks could borrow overseas and they could increase their risk-taking. As interest rates were typically higher in Asia, there were lots more inflows into Asia that were then being lent to real estate or whatever, which could lead to greater volatility later on. I am not going to talk about capital flows too much but really what is happening is that more capital is coming in. When more capital comes in, the exchange rate tends to appreciate, so, from a foreigner's perspective, it looks really good. A higher return is available, while the currency is appreciating, which could add further to what they are getting.

Indonesia: Macro-Financial Linkages. Property prices had gone up dramatically by January 2013 and have since come down in terms of growth. One of the reasons property prices were going up was because of the huge capital inflow we talked about. Interest rates were very low in the US, money was coming in as capital inflows but also the banks were borrowing money to lend in the Indonesian market. One thing that most of you in Indonesia will know is that problem loans, including NPLs, special mention and restructured loans, remain elevated at over 10% of total loans due to legacy effects from the falling commodity prices and the slight economic slack. This is due to the loans taken in 2012-2013 by people thinking conditions would continue to improve, but then in 2013-2014, commodities prices started to go down. Therefore, a lot of companies in the commodity sector that borrowed were unable to repay the loans. Furthermore, property prices were also going down and steadily, economic growth has been much lower. Together, that has led to these problems. GDP growth in 2012-2014 was around 6.3-6.5% and has since dropped to around 5% now. GDP growth has come down quite a

bit. When the growth rate tends to slow, incomes are slowing, and non-performing loans are likely to increase.

Figure 6.3. Indonesia: Loan and Deposit Growth
(%YoY)

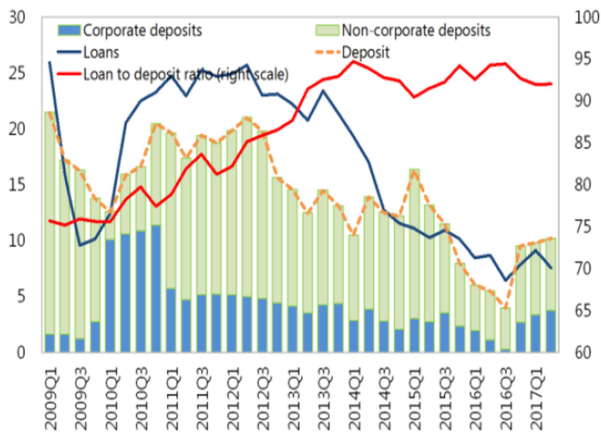
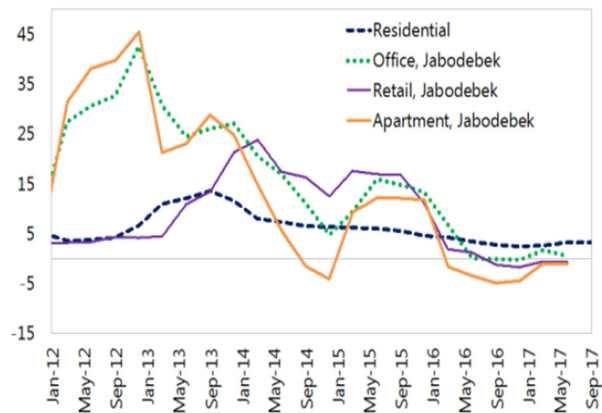


Figure 6.4. Indonesia: Property Prices
(%YoY)



Source: IMF (2018)

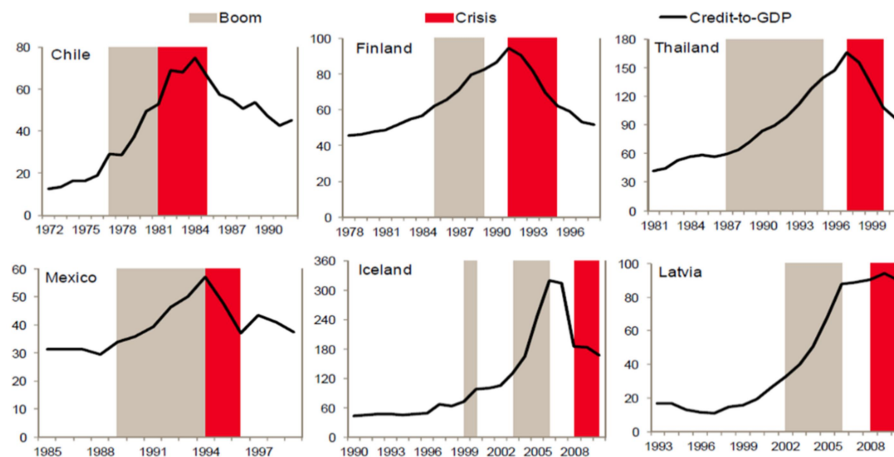
2. Amplification Channel: Credit and the Current Account

Looking at some measures of vulnerability, one being the current account and another, real credit growth. What they show is that in Indonesia's case, the current account was pretty close to 0 or -2% of GDP, while credit growth was very high. This is the picture before the 2013 Fragile Five mini crisis related to the Taper Tantrum in 2013. Financial risk cycles and business cycles are slightly different. Real business cycles tend to be much shorter, whereas financial cycles are much longer, typically 15-20 years. In recent times, however, financial cycles have tended to be a little shorter. Crises have always been there, but we have seen them more frequently in the recent past. We have also seen the amplitude rising.

Credit Booms and Financial Crises. These are just some cases of different countries, which show what happens prior to a crisis. The black line is credit-to-GDP, which tracks an upward trend, implying that credit

is increasing much faster than GDP. What is happening here is that typically, credit increases very sharply during the boom period and then tends to decline in the bust period. This is typical in most cases. In fact, two of the most important indicators that have been recognized by the Basel Committee as very critical after the 2007/08 crisis are credit-to-GDP and real estate prices. One needs to be very cautious about both of those indicators because they tend to be associated with most financial crises. In all these cases, there was a boom when credit-to-GDP was rising rapidly.

Figure 6.5. Credit Booms and Financial Crises

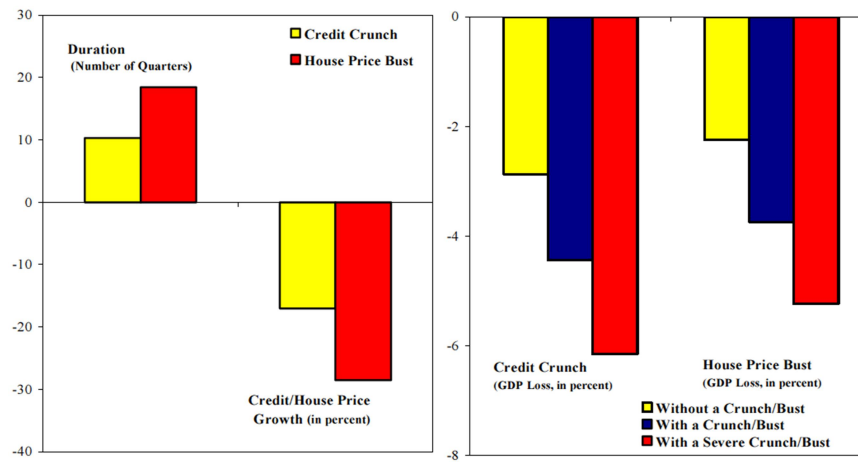


Source: Dell'Ariccia, et al. (2012)

Empirical Evidence on Macro-Financial Linkages

If you have a crisis where there is a credit crunch and real estate prices going down, the cycle tends to be much deeper and much longer.

Figure 6.6. What Happens During Recessions, Crunches and Busts?



Source: Claessens, et al. (2008)

Managing the Financial Cycle

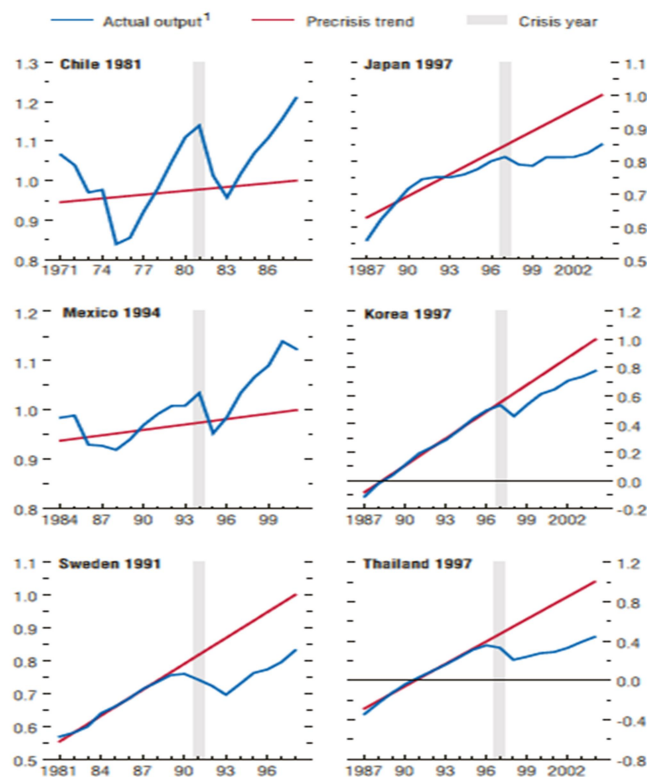
We want to manage the financial cycle in order to avoid too much volatility and a bust. First, it is important to establish where you are in the financial cycle. If you are much above what the trend would indicate, that is when you have to take policy decisions to tighten credit or tighten the financial markets. If you do not take action at the time of the boom, the bust will be deeper. You have to stop the boom before it becomes too much of a boom. That is the key. Busts of financial cycles go hand-in-hand with balance sheet recessions, which are very costly. The idea is to reduce the procyclicality. When the economy is growing very rapidly and financial sector credit is growing very rapidly, you want to stop it at that point, otherwise it may become very expensive. Setting policy without regard to the financial circle can be costly. If you are growing much above your trend, care is required. Therefore, can central banks meet two objectives, namely inflation control and financial stability, with one tool, namely interest rates? Here is a role for macroprudential policies. Macroprudential policies have been used, especially in this part of the world, for many years but this is becoming a policy tool increasingly utilized in advanced economies, relating to loan-to-value (LTV) ratios. If I reduce the LTV ratio, for example from 80% to 70%,

that means that now an individual has to bring in 30% rather than 20% and, therefore, the incentive for that person to take on more loans tends to reduce. That is one example.

Medium-Term Output Per Capita after Financial Crises

As I mentioned, there could be a huge loss in terms of GDP growth in the event of a crisis. These are all country examples.

Figure 6.7. Medium-Term Output per Capita after Financial Crises: Case Studies



Source: IMF (2009)

Structural Dimension of Systemic Risk

All these institutions are interrelated. Any problem in one institution could impact the entire system and that is why the central bank has to be cautious, looking at what is happening to each individual institution, but they also have to put it all together. There are small domestic banks and large

domestic banks and then something called global banks, which could play a critical role.

Interaction	
Comment:	Actually, there are about 15 domestic systemically important banks in Indonesia as confirmed by a recent OJK release at the Financial Stability Committee.

Capturing the Structural Dimension

Different criteria are used to capture the structural dimension, namely: i) balance sheet exposures at the level of financial institutions, jurisdictions and sovereigns; ii) risk-adjusted balance sheets -assets in the real sector might receive a higher risk weighting, for example; iii) probabilities of distress for institutions; iv) network analyses of bilateral and common exposures; and v) other market-based indicators, for example regime shifts in financial market volatility. The authorities can also look to see if there are any currency mismatches or stuff like that.

Identifying G-SIBs

Something that the Basel Committee has talked about are Globally Systemically Important Banks (G-SIBs) and there are five criteria, namely (i) the size of the bank relative to a sample of the 75 largest banks in the world. The individual indicator is the total exposure as defined for use in the Basel III leverage ratio; (ii) interconnectedness; (iii) substitutability; (iv) complexity; and (v) cross-jurisdictional activity. I do not want to go into the technical aspects of this but suffice to say that you want to find out the globally systemically important banks, so that if any of these large banks, such as JP Morgan or HSBC, has a problem, then that could impact the financial system globally because they have dealings across the world. That is what the basic idea is. Before the 2007/08 crisis, Credit Suisse may only have been monitored in Switzerland rather than being monitored across the world wherever

branches are located. This is where the supervisors and the supervisory authorities need to come together to take care of this. The other thing is that because these are globally systemically important, if, on the basis of these measurements, they land in a high-risk category, these banks would be required to bring in more capital, providing more capital availability against losses so that it is not born by the public sector as a bailout. Based on these criteria, the banks are categorized into five buckets. There is currently no bank in bucket five. For example, if you are in bucket one, the bank would have to bring in perhaps 1% of additional capital. In bucket two, the bank would have to bring in an additional 1.5% of capital and so on.

Similar to G-SIBs, you may also want to identify certain domestic systemically important financial institutions. If a very large bank goes bust, it could have an impact on the entire domestic system. What banks in Indonesia have been categorized as domestic systemically important? BCA is a good example, but public sector banks should also be categorized as domestically systemic.

The Smell Test

As regulators you need to be constantly on your toes. There are a number of potential questions to ask about the build-up of vulnerabilities:

- Are there any signs of speculative behavior? Typically, the real estate sector is affected first, but it can also happen in the stock market. You never really know whether stock-market prices are too high or too low. In the real sector, however, you can start to get some idea, especially when compared to your personal disposable income increases and so on.
- Are particular asset classes heavily advertised or discussed in the media?
- Are banks taking large positions where profits continuously exceed measured risks?

- Are there relatively new products with large market shares and have they been increasing rapidly?
- Are lending standards weakening?
- Are profit margins decreasing?
- Is competition increasing from the shadow banking sector?

Systemic Risk and Balance Sheet Linkages

Key Role of the Banking Sector

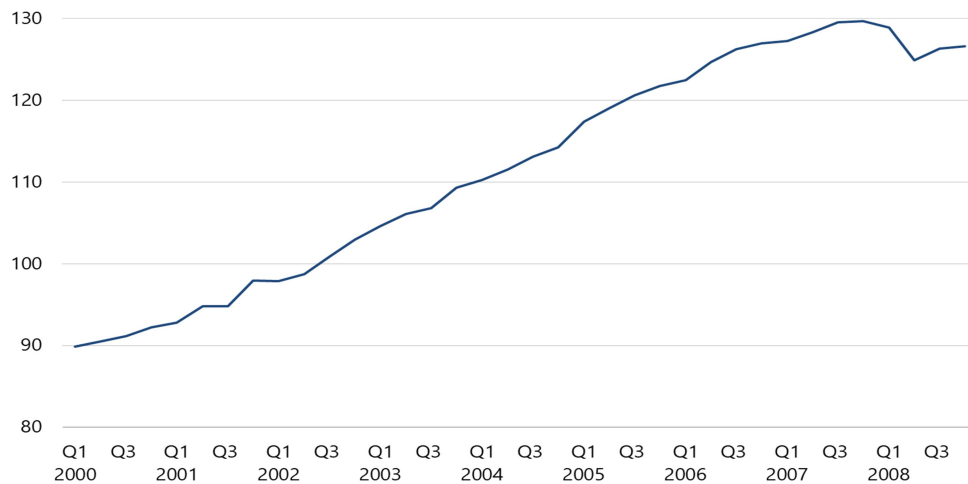
The banking sector is the provider/holder of assets and liabilities. Such as in the Greece case, bank balance sheets are intertwined with the entire economy, including the government sector, corporates, households, banking system and financial system as a whole. The implication is that systemic banking crises can be very severe.

Role of Leverage/Debt

Leverage is about taking on more loans and leveraging increases the vulnerability of debtors to environment changes, such as risk aversion, interest rate/exchange rate changes. If countries, financial institutions or corporates take on many more loans, they become riskier. Typically, crises involve debt repayment difficulties for one or more sectors. Leverage is very important because if you leverage, there is lots of money to be made when the going is good but when the going turns bad, a lot of money is lost and not only that, everyone else is also losing money. When the economy is doing really well, banks tend to make huge loans, there is a lot of construction going on, foreigners are investing, jobs are easier to come by and income levels are rising, therefore, people are willing and able to take larger loans. Those are the good times. But what happens in the bad times? Debt servicing tends to become more difficult for one or more sectors as the crisis develops. Foreign

credit dries up, the banking system needs to deleverage, the value of collateral falls, and the trade credit becomes more difficult.

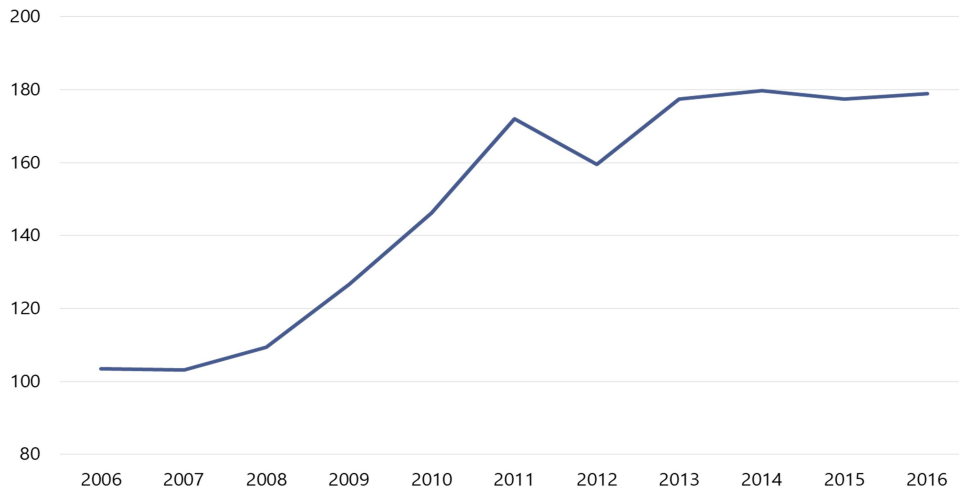
Figure 6.8. United States: Ratio of Household Debt to Disposable Income
(in percent)



Source: CEIC

As an aside, in terms of balance sheet linkages, US household debt increased rapidly from 2000-2008, and before that as well, to become huge. And then it hit a bump. Similarly, public debt in Greece increased dramatically to bail out the banking system. And then it hit a bump too.

Figure 6.9. Greece Government Debt-to-GDP
(in percent of GDP)



Source: CEIC

Sovereign and Non-Financial Private Sector Debt-to-GDP Ratios

As presented in the Global Financial Stability Report, the IMF typically looks at the sovereign and non-financial private sector debt-to-GDP ratios. If we look at the debt levels of advanced economies, we can see that here, Japan has a very high level of public debt along with the US and Italy, whereas Australia and South Korea are much lower. You would think that these are potentially more vulnerable but there are other issues that come up. You will see now that US debt-to-GDP has come down quite substantially. In the case of Australia, it has gone up as well as in the case of South Korea. In terms of non-financial corporations, you can see that in the case of Canada, US, UK and pretty much every other advanced economy, it has gone up pretty sharply. We would like to know what is driving that. If you look at non-financial corporations in the case of Germany, their borrowing as a share of GDP is much lower. Even the households tend to be fairly low. In terms of the emerging markets, government borrowings are still relatively high in Brazil and India. Household borrowings are much lower than what we saw for the advanced economies. In general, except China, most other countries' non-financial corporations have a lower debt-to-GDP ratio. Nonetheless,

these financial systems are not as well developed. In China's case, this borrowing has gone up dramatically in the last decade but dominated by state-owned enterprises to restart the economy after the crisis.

Figure 6.10. Sovereign and Nonfinancial Private Debt-to-GDP Ratios
(in percent)

		General government		Households		Nonfinancial corporations		TOTAL	
		2006	2016	2006	2016	2006	2016	2006	2016
Advanced economies	JPN	184	239	59	57	100	92	343	388
	CAN	70	92	74	101	76	102	221	295
	USA	64	107	96	79	65	72	225	259
	GBR	41	89	90	88	79	73	210	250
	ITA	103	133	36	42	67	71	205	246
	AUS	10	41	105	123	73	79	187	243
	KOR	29	38	70	93	83	100	183	232
	FRA	64	96	44	57	56	72	164	226
	DEU	66	68	65	53	49	46	180	168
Emerging market	CHN	25	44	11	44	105	165	142	254
	BRA	66	78	14	23	39	44	118	145

		General government		Households		Nonfinancial corporations		TOTAL	
		2006	2016	2006	2016	2006	2016	2006	2016
economies	IND	77	70	10	10	38	45	125	125
	ZAF	31	52	39	35	33	37	104	124
	TUR	45	28	9	18	27	67	81	113
	MEX	38	58	12	16	14	28	64	103
	RUS	10	16	8	16	32	52	49	84
	SAU	26	13	12	15	28	50	66	78
	ARG	70	54	4	6	20	12	93	73
	IDN	36	28	11	17	14	23	61	68

Dark shading denotes a higher debt-to-GDP ratio in 2016 than in 2006

Source: IMF (2017)

Balance Sheet Linkages

Just to reiterate, what is happening here is that the government is borrowing from the banking system and then the banks are making loans to firms and households. Households may be investing in the stock market and so on. What happens if the firms' debt becomes higher and they are unable to repay the loans? Then there are problem loans and there are two implications. First, the situation is really bad and the banks are unable to get anything from the corporate sector, which could then blow up into a crisis. Second, the situation does not blow up into a crisis but the banks have increasing non-performing loans. Why are increasing non-performing loans a problem?

It can do two things: make the system vulnerable and impact credit growth. Would you like to elaborate on how it can impact both of those things?

Interaction	
<i>Participant:</i>	Even if it is not a crisis right now, it could be a vulnerability that turns into a crisis. In Europe, we have the case of Italy for example, which has a very high level of non-performing loans and everyone is worried that this could turn into a crisis at some point. The thing about hampering credit growth in general is that, if a bank has a lot of non-performing or troubling loans on its balance sheet, it may have difficulty creating further loans and supporting the economy due to vulnerabilities on the balance sheet.
<i>Speaker:</i>	Absolutely right. The first point is that it is vulnerable because the banks are not in great shape, so the economy generally becomes vulnerable. Regarding the second point about why banks are unable to make loans, if there are more problem loans, how would it hamper the banks' ability to lend?
<i>Participant:</i>	If non-performing loans are very high, it will really lead to a reluctance on the part of the banks to lend further. If a bank is not getting its money back from lending, why would it lend more? This is a typical case that India is facing because of very high non-performing loans. We conducted an asset quality review over the past couple of years and there has been a reluctance on the part of the banks. There have also been scandals recently and this has impacted the desire of the banks to lend because they do not want to take on additional risk. It is as simple as that.
<i>Speaker:</i>	You are right. Higher non-performing loans reduce the desire for banks to lend. What about the ability of banks to

	make loans?
<i>Participant:</i>	That is dependent on the economic scenario.
<i>Speaker:</i>	That is right to an extent, but I am trying to get at a specific thing affecting the banks.
<i>Participant:</i>	The non-performing loans will eventually eat up the capital.
<i>Speaker:</i>	<p>Absolutely. Because of non-performing loans or problem loans, you would need to provide more capital. Therefore, the capital adequacy ratio is going to go down. If a bank would like to make more loans, more capital would need to be brought in and if not, the bank's ability to make more loans would be reduced. It is both a case of willingness, which is the desire, and the ability. It is very important to realize that. Typically, when a bank is lending to the real estate sector, on a system wide basis, is more lent to households or the corporate sector? It depends because you could also have real estate companies that could be borrowing to build buildings or to develop real estate projects. It need not only be individuals, it could also be corporates. I will come back to Vietnam's case in a second but if real estate prices collapse, it would impact the balance sheets of both the households and the corporate sector. In Vietnam's case, a lot of state-owned enterprises were setting up banks and lending to the real estate sector before the 2007/08 crisis. Once those banks did badly because the real estate sector was not doing well -and some of those loans were channeled into real estate companies- the banking system was impaired along with the corporate sector and the household sector. Typically,</p>

individuals will try to repay their loans. Therefore, these loans to both firms and households could impact the banking system. If the households and firms are in trouble, incomes are not rising, what is going to happen to the deposits in the banks? If people are uncertain about their jobs, firms have incurred losses, what is going to happen to deposits in the banking system? Deposits will go down or not rise as rapidly. In an extreme case, the money could be removed from the country, which is something that happened in Greece, where you could move from one country to another in the same currency. The Greek government was in distress, foreign banks were selling Greek debt, the loans to government had to be written down, so the banks' assets and net worth decreased. What happened was that money was removed from Greece and placed in other countries. You have got to be careful about all of these issues and how the entire system is interrelated. It is not necessary that somebody is doing it on purpose.

I used to work for an Italian company from 2010-2014 as part of the global asset allocation committee. When they invested, they invested across-the-board in Europe. They did not really care about the country risk because to them everything looked the same, be it Greece or Germany. After the 2010 crisis, however, the centers in different countries were actually repatriating their assets from other countries. If I am the CEO of a Spanish pension fund, and I was holding German bonds, I was actually selling German bonds to get Spanish debt onto my books so that my asset liabilities could be matched in currency and country terms.

There was a certain amount of financial disintermediation in the euro area after 2010. All of these issues must be kept in mind.

As I said, the foreign creditors and debtors are very important. In Greece, public debt in Greece increased dramatically to bail out the banking system. So, the US, which is a USD15 trillion economy at that time, was borrowing 6% from outside, which is effectively a capital flow. The US was dependent on foreign creditors and depositors -the US is an extreme case because the US dollar has reserve currency status as well- but imagine if a huge amount of that went out, then there would be trouble. That is what happened in many countries, in various ways. In the case of Iceland, before the crisis, there was a lot of borrowing by the Icelandic banks and they made loans to the real estate sector. The real estate sector then collapsed because of the crisis and these banks were left without deposits to be paid back and that created a mess because they had been borrowing outside to meet the needs for investment and real estate. In Thailand's case, it was similar before the Asian crisis.

Balance Sheet Effects

Some other things that are important in the balance sheet linkages part are the relationships in terms of currency composition. In the case of Asia, do banks borrow or lend overseas? Think about the asset side and the liability side on the balance sheet. In Asia, they are making loans. To make those loans, you need deposits on the liability side. If a bank does not have enough deposits, it borrows outside. If a bank borrows outside, it will be in a foreign

currency. A bank may borrow outside because interest rates overseas are lower. If they are borrowing in a foreign currency, they have to repay in that foreign currency. If, however, the borrowed dollars are used to make loans in rupiah, a currency mismatch situation could ensue because the borrower you are lending to is borrowing in the local currency but if the currency were to weaken, the bank would take the entire risk and would have to pay back more dollars in terms of the local currency. That is what is called a currency composition mismatch and that puts your banking system at risk.

There can also be a maturity risk or liquidity risk. Therefore, banks typically borrow shorter term, taking that money from deposits, which tend to be shorter term, and lend longer term. If a bank does a lot of that, it could be in trouble. One of the things that happens is that if they do not have enough deposits to make the loans, they borrow in the interbank market. This was very common before the global financial crisis. If they were making loans for mortgages, the banks would -in the case of the UK the mortgage rate is around 6% and the interbank rate is around 4%- continue to roll over the borrowing and lend at 6% to make 2%. What happened in 2007/08 was that nobody was willing to lend in the interbank market, this made it very difficult for banks to roll over their loans. Consequently, the banks started calling in their loans but for people who had taken long-term mortgages, it would be very difficult to pay back. There was a bank, Northern Rock, in the UK which used to specialise in this, which got into difficulty and had a run on its assets in 2008. Northern Rock used to borrow in the short-term market and make long-term loans, but they had trouble when this got frozen. When it got frozen, people were unsure whether the bank would be able to repay the deposits, so a huge line formed in front of Northern Rock. Consequently, everyone thought the bank was going to fail and sure enough, the Bank of England had to come and rescue it. That is another risk.

There may also be fixed versus flexible interest rates. Say you have got short-term debt, if you are borrowing on flexible rates, especially overseas,

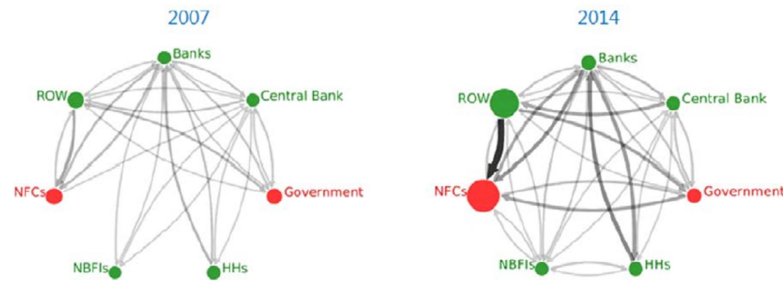
and you had to keep rolling over, the rates could go up and that could impact the costs. There are also counterparties and counterparty/funding risk. An example would be when Lehman Brothers could not repay Citibank. That is a counterparty risk. There are many products where risks are taken on different banks, even by individuals. If you are putting your deposit today in Bank Danamon or Standard Chartered Bank, you are effectively taking that counterparty risk because the bank could go bust. That is just a simple case of counterparty risk. The more complicated financial instruments you have, the more complicated your counterparty risk is. That is why you want to run stress tests from a macro perspective to see what would happen if there are some stresses in the economy, such as interest rates increasing by 5%, exchange rate depreciation of 30%. How would that impact each bank and, through counterparties, how would it impact the entire financial system? There is also the Financial Sector Assessment Program (FSAP), which does this. This was done in Indonesia in 2017 and the report is available on the IMF's website if you are interested.

Case Study: Indonesia

Balance Sheet Linkages

In Indonesia, the risks are fairly low currently as they are perceived. This shows the balance sheet linkages from a Selected Issues paper published a few years back. The lenders are the rest of the world. The green part is the banks and central bank. The borrowers in red are the non-financial corporations and the government. The size of the node indicates the vulnerability. Compared to 2007, the non-financial corporate sector borrowed a lot more in 2014 and most of that came through an increase in borrowing from the rest of the world. That could be a bit of a vulnerability, namely that there has been greater borrowing by the corporate sector and it is mostly from the external sector.

Figure 6.11. Indonesia: BSA matrix in network map form

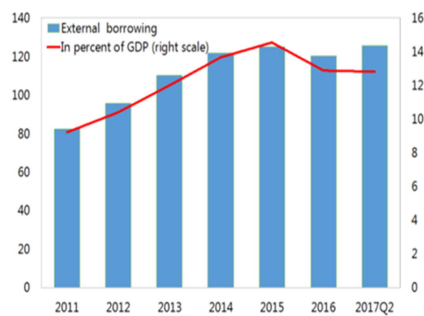


The thickness of the arrow indicates the size of gross exposure, while the color of the nodes distinguishes net creditors (green) from net debtors (red). Source: Harutyunyan and Munoz (2018)

Corporate Debt

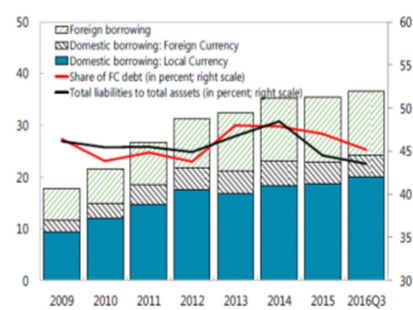
This graph shows there was a rapid increase in external borrowing by the corporate sector from 2011-2014. It went up by about USD40 billion, from 8-9% of GDP to almost 14% of GDP. That has now stabilized. The next graph shows the extent of foreign borrowing and domestic borrowing in Indonesia.

Figure 6.12. Indonesia: Corporate External Debt
(In billions of U.S. dollar and in percent of GDP)



Source: IMF (2018)

Figure 6.13. Indonesia: Corporate Borrowing and Leverage
(In percent of GDP, otherwise noted)



Example: Capital Outflows

Capital outflows will lead to currency depreciation. One scenario is that there are no foreign-exchange mismatches and if that happens the exchange rate plays a self-correcting role and the economy continues to grow because if the currency depreciates, exports tend to increase, imports will go down and so the current account may improve.

In reality, there are always going to be some FX mismatches, for example borrowing in US dollars and lending in rupiah. The fiscal condition will deteriorate, which means the government has less fiscal space, the debt service costs go up, the probability of default goes up along with financing costs. This was a problem in Indonesia's case in 1998, when the government's debt was around USD75 billion. Then it increased as the exchange rate plummeted. Indebted firms and households with foreign exchange debt could also be in trouble, with the debt service costs increasing along with bankruptcies and job losses. Before the global financial crisis, a lot of the Scandinavian banks were lending money in Eastern European countries in euros to households to purchase property. When the crisis happened, the individual households were still earning in the local currency. The local currency lost value and they had to pay in foreign exchange, so that households experienced a currency mismatch and household balance sheets got impacted. If the household balance sheet gets impacted, consumption and investment are going to go down in terms of residential property and so on. Finally, the banks are impacted if they have borrowed in foreign exchange and the currency depreciates because they have to repay the loans in the foreign currency. Such conditions could lead to a credit crunch. If you think about it, all sectors of the economy are being impacted, including the government sector, firms and households, as well as the banking sector. Therefore, vigilance is required concerning foreign currency mismatches. In this case, imports will decline not only because of the exchange rate but demand for imports will also go down significantly as imports become more expensive because the household and corporate balance sheets are worse and the government's balance sheet is worse. Consequently, no one will be increasing demand. Shrinking demand for imports will lead to a current account surplus. That is what typically happens in most crises. When you have an impact through the foreign exchange channel, demand typically collapses and import demand collapses sharply. That is why at the time of the

Asian financial crisis, all the crisis countries moved into a current account surplus from a current account deficit, including Thailand, Indonesia and South Korea. All of them suddenly moved into a current account surplus because domestic demand was compressed drastically as balance sheets were impacted across the board.

Why FX Mismatches? Foreign currency interest rates are lower so it appears cheaper to take on foreign exchange debt. This situation can be exacerbated during a credit boom, when domestic demand increases, which pushes up inflation. In response, the central bank raises interest rates, so there are more inflows. If there are more capital inflows, there is more lending. It is all very pro-cyclical.

Conclusions

Financial stability is very important for a well-functioning economy, both in terms of ensuring there is adequate savings being moved to investment for growth and secondly to ensure that monetary policy transmission works effectively. There is a trade-off between financial stability and development. If you develop the financial system too quickly, that could lead to financial instability and higher volatility of economic growth, which could also lead to a crisis as well. It is important to manage systemic risk, both across time, which is related to the pro-cyclicality element, and structural in terms of who you are lending to. It is important to make sure the loans are going to the right people and that systemically important banks are being taken care of. Balance sheet linkages are very critical. The financial sector is very important and very central to all of this. The financial sector is very important to ensure that growth picks up but at the same time, it is pro-cyclical, so if financial sector credit growth goes up very sharply, that also helps economic growth but if there are problems it moves the other way round. You could have a problem with the economy and a huge problem with the financial sector. You have got to be careful in terms of ensuring that

you do not go too far too fast. You want to ensure the right policies at the right time so that the amplitude of the cycle does not become too large. Central banks have to control things during the boom time rather than rely on damage control during a bust.

Interaction	
Participant:	How do you estimate what the impact could be of a declining oil price on financial stability?
Speaker:	<p>That is true of any country, both in terms of oil exporters and oil importers. For oil exporters, a lower price is more of an issue and for oil importers, a higher price is more of an issue. I personally believe lower oil prices are a major reason why Indonesia's economic growth has been slow over the past 3-4 years. If you think about it, 2014 was when oil prices went down, especially in the third and fourth quarters. When the oil price fell, a large portion of fiscal sector revenues were coming from oil revenues. When oil revenues fell, the revenue-expenditure gap increased so much to beyond Indonesia's 3%. There was something done immediately after that by the Ministry of Finance. Actually, two things were done one after the other. One was that a significant chunk of corporate taxes and income taxes had to be paid within 2014. After that, there was a tax amnesty scheme. If you look at revenues to GDP, however, because the oil price was going down, that remained fairly low in 2016 and to a certain extent in 2017. Now, oil prices have picked up along with other commodity prices, which will hopefully show up in the form of a little bit more revenue, not as much though. On the fiscal front, Indonesia had that issue because you have</p>

not been able to adequately address the issue of capital investment by the public sector, which is also part of the reason why the slowdown is there. In the financial sector, you saw that the total problem loans remained very high. Therefore, you have to be constantly vigilant as to what is going to happen to your overall macro economy, when oil prices go up or down or commodity prices for that matter, which is important to Indonesia. Even something like a VAT collection gets impacted in Indonesia when commodity prices go down. Although you may not think of it like that. Those are the kinds of things that you need to think about.

7. Macroprudential Policies and Institutional Arrangements

Reza Y. Siregar, Yoke Wang Tok, and Mahir Binici

Introduction

You cannot have effective macroprudential policies without a good governance framework or institutional arrangements. This is an area that continues to be important despite the fact that we now have FinTech, the digital economy and everything else. I think it has become even more important because you cannot have FinTech and innovation without a framework that anchors financial stability. As much as every central bank in the world is trying to get onto the FinTech bandwagon, I think we should continue to enhance our macroprudential framework all the more. It makes this even more important. Everything that you do as a central bank and macroprudential authority, you need to keep your eye firmly on financial stability.

Macroprudential Policies

If the global financial crisis has taught us anything at all, it is really about this gaping hole in the middle. Before the crisis, there were macroeconomic policies and monetary policies to keep inflation under control. The supervisors were using micro-prudential policy to look at the safety and soundness of individual financial institutions. Unfortunately, there was nothing in between, namely nobody was checking the whole system for systemic risk, making sure that the whole system is safe. That is where macroprudential policy comes in, filling in that hole in the middle. Macroprudential policy operates in a very complex and diverse environment, so you cannot depend on just one person. You cannot do it alone; it requires the coordination and cooperation of many authorities. Unlike monetary

policy, there is no one target/one instrument, macroprudential policy has multiple targets, including credit growth, house prices and all sorts of things along with multiple instruments.

Key Institutions Involved In Financial Stability

Macroprudential policy is so diverse, therefore we have many authorities or institutions that should be involved in financial stability. There is the central bank, which is a very natural authority to look at financial stability issues because it is a liquidity provider and lender of last resort in a crisis. The central bank provides liquidity assistance to the banks. Next are the supervisors of the banks, insurance companies and securities companies. There are also prudential market conduct regulators. There are many people involved.

Poll: Where Should The Macroprudential Authority Be?

I would like to do a poll, where do you think the macroprudential authority should be? The vast majority of participant think that the macroprudential authority should be at the central bank. Can anyone elaborate more?

Interaction	
<i>Participant:</i>	The question is so biased towards the central bank workers. I am from the government. I think the results are due to the majority of the people in this room working at the central bank.
<i>Speaker:</i>	There is a strong reason for the central bank to be the macroprudential authority because the central bank has a lot of expertise and it has the data, especially if the banking regulators are within the central bank.

That is true but there are some central banks, like in Indonesia, where the two functions are separate. I was involved with training BI when I worked at the Toronto Centre and I know there were a lot of frictions there during the transition period from BI to OJK. You can tell by some of these issues. Let us move onto the next question. Why are institutional arrangements important for macroprudential policy?

To prevent bubbles; systemic risk is involved; effective policy implementation; to avoid financial crises; for the stability of financial institutions; to improve financial stability; to control inflation stability; reliability and accountability; contingent effect and interconnectedness; for quality control; macroprudential policy should have power to affect a wide range of sectors; to acknowledge who is doing what; coordination amongst institutions; to make effective policy.

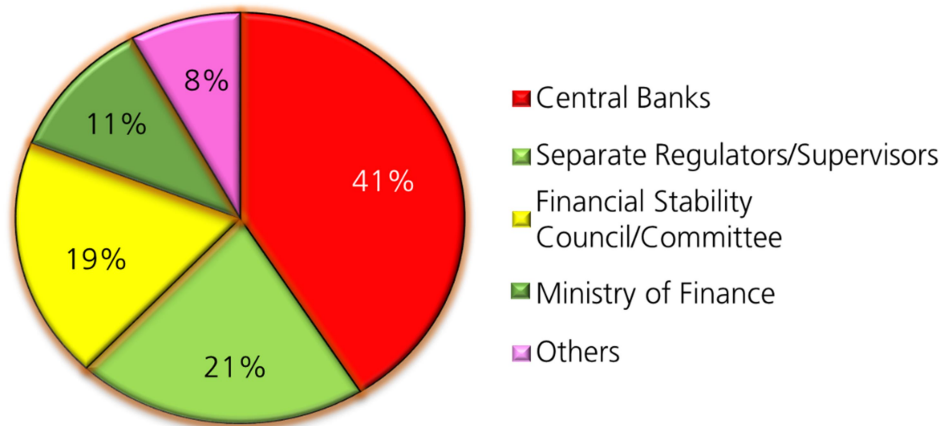
It is very important to have someone who can make decisions and be responsible. It would seem that you all agree that having institutional arrangements is important. Later, I would like to show you some research that tests which kind of institutional framework is better for the effective implementation of macroprudential policies. There is no point talking about where the macroprudential authority should be if we do not know whether it is effective or not. What we are aiming at is the outcome. I do not care how you get there but I care whether you achieve the outcome, namely stability.

Who Runs Macroprudential Policy (In Asia)?

This shows the results of an IMF survey conducted in 2010 of 21 countries with an explicit or implicit macroprudential mandate. In Asia, 41% of countries give their central banks the authority for macroprudential policy, while 21% favor the Ministry of Finance and 19% a financial stability committee. This survey is from 2010 and the latest was performed in 2017 with a sample of 111 countries. Of the 111 countries surveyed, 30 were still without a macroprudential authority. In contrast, 35% of the 111 countries

had the central bank as the sole macroprudential authority. Several countries had a central bank and committee as the macroprudential authority. That seems to be the most prevalent pattern.

Figure 7.1. Asian Countries with an Explicit or Implicit Macroprudential Mandate



Source: IMF (2010)

Indonesia: Financial System Stability Forum. In Indonesia, the macroprudential authority is the Financial System Stability Forum, which is a committee solely responsible for financial stability, comprising of seven members and chaired by the Minister of Finance. Of the seven members, three are from the Ministry of Finance, three are from Bank Indonesia and one from the Deposit Insurance Corporation (LPS). The FSSF is a venue for coordination, cooperation and information exchange amongst the authorities responsible for safeguarding financial system stability in Indonesia. Under the Financial System Stability Forum is the executive forum and working team, which do the work and feed the analysis for the decision-making body (FSSF).

The key functions are to discuss the various issues confronting government stakeholders in the financial system with potential systemic impact, as informed by the financial institution supervisory authority; to coordinate and exchange information for synchronization of laws and regulations concerning the banking system, non-bank financial institutions

and the capital market; and to coordinate the implementation or preparation of specific initiatives in the financial sector.

Importance Of Coordination

Having a committee is common to coordinate all the different parties involved and understand what is happening overall. Data sharing is very important. Later, we will look at the case of South Korea, where even having an MoU does not guarantee good data sharing. One of the issues when Indonesia decided to separate the banking supervision function away from the central bank was data sharing. In Indonesia, there are two financial stability analysis departments. Bank Indonesia is in charge of designating the systemically important banks but the Indonesian Financial Services Authority (OJK) are the supervisors closest to the ground, who know what is happening in the banks, and who have the banking supervisory data that is needed by Bank Indonesia to do its analysis. Consequently, there were some worries or concerns at that time whether BI could get the data that it needs for analysis.

Interaction	
<i>Participant:</i>	We have an MoU along with numerous operational procedures to make sure that both institutions have effective data sharing mechanisms. After four years of working together, both institutions are in better shape in terms of sharing the information.
<i>Speaker:</i>	That is great to hear. I think that is one big issue to solve for any central bank that is trying to do this job well. Having a committee does not guarantee anything. Without the data we are dead. Therefore, data sharing, information exchange and open dialogue are imperative. Another country that I know quite well, Vietnam, was trying to set up a macroprudential authority but they found it to be a challenge, in terms of data sharing. There are a lot of turf

issues involved, typically. Later, I will share some of the real-world case studies.

What Are The Elements Of A Strong Institutional Framework?

Three things are crucial: willingness to act; ability to act; and effective cooperation. This does not happen overnight. This has to be worked out and refined over time. The first thing is to recognize the need for a strong institutional framework to ensure the authorities can act in a timely fashion. On the monetary policy front, we have countries going onto the inflation targeting regime, like Indonesia, Thailand and the Philippines, which is good because ITF makes the central bank accountable for hitting the inflation target. The central bank has to act pre-emptively and in a timely manner. The central bank cannot be behind the curve. When the risk is at its peak, namely credit growth or house prices are at their peak, it is already too late to respond. A strong framework is also needed to ensure access to information and effective surveillance capacity. The framework has to facilitate cooperation and data sharing. A strong framework is also needed to promote collaboration and information sharing, while preserving the autonomy of separate policy functions.

Interaction	
<i>Participant:</i>	The concept of peaks and troughs is an exposed concept. You will not know the peak and the trough in terms of the timing of the instruments. That is really an issue.
<i>Speaker:</i>	We can all be experts exposed. It is called the benefit of hindsight. When you are at the point, how do you know if the graph is still going up or going down? That is where you need to have a lot of quantitative and qualitative information and your gut feeling. A lot of judgment is also needed. It is not easy but sometimes it is very obvious.

Before the crisis in the US, it was pretty obvious that they were having a bubble. The Big Short is a movie about the sub-prime crisis in the United States. In that movie, a stripper has taken out five loans, one of which was to her dog. When it gets to that point that anybody can have multiple loans, there is no proper due diligence and you know something is wrong. There are signs and indicators that you can use but making that judgment call for action takes a lot of courage and conviction. Something I like to stress is that there is no point doing the analysis if you are not willing to take action.

Willingness to Act

There are two basic principles. First, assign the macroprudential mandate to a body or committee, which helps ensure accountability. Second, the central bank should play an important role in macroprudential policy in order to help foster coordination between macroprudential policy and monetary policy.

Well-Defined Objectives. In order to have accountability you need well defined objectives. In other words, what is the purpose of your macroprudential policies? To ensure financial system stability and resilience. To contain risks from unsustainable increases in credit and leverage. And to contain risks from inter-linkages in the financial system. It is important to look at inter-linkages in the financial system in order to connect the dots. That is where the micro supervisors cannot help because an individual bank may be fine, they do not see the whole picture. That is where the macroprudential authority comes in and looks at the overall picture, connecting the dots. Later, I will talk more about inter-linkages in the context of capital flows, which is very important. Secondary objectives may also be appropriate to ensure the

financial system supports long-term growth and protects the interests of depositors. Well-defined objectives are essential to willingness to act.

Ability to Act

The powers needed to ensure the ability to act include information powers, calibration powers and designation powers. Designation powers are required by Basel III in order to designate systemically important financial institutions (SIFIs) and initiate changes in the regulatory perimeter over time as the financial system evolves. Chinese banks already account for the top four or five GIFIs. That is how big China is nowadays. Other than GIFIs, each country has been asked to designate its own SIFIs. In Indonesia, there are about 15 or 16 SIFIs. We need to designate systemically important financial institutions to reduce the moral hazard associated with too big to fail. We know that if an institution is too big and its failure threatens the entire financial system, the government will definitely step in and bail out the institution. Systemically important financial institutions have greater responsibility in terms of capital. That makes sense. The authorities need to limit that moral hazard risk. Information powers mean the ability to obtain information from other agencies and fill data gaps. Calibration powers influence the activation and calibration of regulatory constraints.

Effective Cooperation

Effective cooperation is important. You need to make people share data. Without a MoU or some other mechanism, people do not share willingly because most of the data is very sensitive. You need to resolve the legal impediments to share supervisory data. You need to involve the supervisors and the regulators in the macroprudential process. We are talking across cultures here. I am not talking about people from different countries. I am talking about people from the same country in a different job

function. They are very different. I was an economist who used to work in monetary policy, then I crossed over to the macroprudential side and I found that people looked at me differently. I found it very difficult to get through to them. They did not care about stress tests and financial stability, their only concern was bank soundness. Back then, during the Asian financial crisis, credit growth was running at double digits and housing prices were very high, but it was not fashionable to look at those indicators. Now, it has become fashionable to look at house prices but not during those times. We have learnt a lot since then. You need mechanisms to foster engagement and accountability. You need the supervisors to understand that they need to do this extra job of coming together with you to look at overall financial stability. It is important to include relevant supervisory and regulatory agencies in the macroprudential decision-making body in order to foster communication and information sharing. Consider including financial stability objectives in the mandate of separate regulators to foster engagement and accountability.

Evolution of Institutional Frameworks

In 2010, the IMF conducted a survey of macroprudential frameworks in 30 countries and found a variety of eight different approaches in total. This was in the midst of the global financial crisis but after the crisis, there was convergence to around 3-4 institutional models. Model A is the most popular amongst our friends here. The mandate is assigned to the central bank and decision power to its board or governor. Model A can work where the central bank is or is not the microprudential regulator. The Czech Republic, Ireland, New Zealand and Singapore apply this model where the central bank is the microprudential regulator (the banking supervisor). Norway and Switzerland also apply model A but the central bank is not the microprudential regulator. Model A is where the central bank has the sole authority. Model B is where the mandate is assigned to a committee within the central bank. There is a defined decision-making structure, which helps counter the risk of dual mandates for the central bank. The UK and Malaysia apply this model. Model

C is where the mandate is assigned to a committee outside the central bank. Therefore, the Ministry of Finance has a stronger role and there is a defined decision-making structure. Australia, France and the United States apply this model.

Strength of Powers

Hard powers are where the macroprudential authority have direct control over the instruments. The authority is stipulated in the law. Hard powers can avoid delays and increase policy effectiveness. In the UK, the Financial Policy Committee has the CCB under its mandate. It can direct the Prudential Regulatory Authority to deploy macroprudential instruments. There is a legal requirement to comply. Semi-hard powers mean the macroprudential authority can make formal recommendations to other agencies. If the other agency does not comply, it must explain why not. Semi-hard powers give broad powers/can influence a wide range of actions. In the US, the Financial Stability Oversight Committee makes recommendations to the SEC on money market mutual funds. Finally, there are soft powers, which are an expression of an opinion or recommendation through a financial stability report (FSR), speech or behind closed doors (without comply or explain requirements). In Sweden, the Riksbank does not have macroprudential power but warns of risk from rising household debt in its FSR. Ultimately, however, the Financial Services Authority has the macroprudential power. A combination of powers is beneficial, but soft powers alone are unlikely to be sufficient.

Institutional Arrangements in Europe & US

ESRB

In Europe, the European Systemic Risk Board (ESRB) was set up after the global financial crisis in January 2011. It comprises of the ECB, the national central banks of the EU, the three new European authorities on banking, insurance and securities, the European Commission as well as the

Economic and Financial Committee. This is a very large committee structure. The role of the ESRB is to conduct macroprudential surveillance across the EU and issue risk warnings and recommendations to any national or supranational authority. The ESRB monitors through an 'act or explain' mechanism. There is an option for the ESRB to publish its recommendations. Therefore, the ESRB has semi-hard powers.

UK (FPC)

The Financial Policy Committee (FPC) was set up after the global financial crisis in 2013 and is chaired by the governor of the Bank of England. The objective of the FPC is to identify, monitor and take action to remove or reduce systemic risk with a view to protecting and enhancing the resilience of the UK financial system. The FPC has 13 members, of which six are BoE staff, including the governor, four deputy governors and the ED for financial stability. Five of the members are independent experts chosen from outside the BoE, selected for their experience and expertise in financial services. The chief executive of the Financial Conduct Authority and the Prudential Regulatory Authority (part of BoE) are also members. The Committee also includes a non-voting member from HM Treasury. The FPC meets on a quarterly basis and the Committee publishes a record of its formal policy meetings and is responsible for the BoE's biannual Financial Stability Report. There are many members of the Bank of England policy committees but the power to make decisions rests with the BoE.

US (FSOC)

It is slightly different in the United States. The 2010 Dodd-Frank Act established a new Financial Stability Oversight Council (FSOC) chaired by the Treasury. Prior to the FSOC, there was a Presidential Advisory Committee on Financial Stability, which was a shadow committee. The role became more explicit, however, after the global financial crisis. The Federal Reserve does not have the authority. The US stands apart because the macroprudential

powers are not given to the central bank. The FSOC comprises of federal supervisory agencies and securities regulators (including FDIC) and the Bureau of Consumer Protection. The FSOC can issue recommendations to constituent agencies and plays a coordinating role but direct regulatory and supervisory authority lies with the constituent agencies. The FSOC can designate non-bank finance companies as systemically important, subjecting them to regulation by the Federal Reserve. The Office of Financial Research (OFR) was established within the Treasury to collect information and conduct analysis and research. The United States is a country that never publishes a financial stability report, whereas the rest of the world are busy publishing financial stability reports.

Institutional Arrangements In Asia

IMF conducted a survey of institutional arrangements in Asia. As you can see, the central banks all over the place. This survey was conducted before 2017.

Table 7.1. Financial Stability Mandate (Selected Asian Countries)

	Mandate established in	Responsible agency
Australia ¹	Executive decision	CB, IR
China	Legislation	CB
Hong Kong, SAR	Legislation, executive decision	CB, I, S, MOF
India	Executive decision	CB, FSC
Indonesia	Legislation	IR, FSC
Japan	Legislation	CB, DI, IR, MOF
Korea	Legislation	CB, IR, MOF
Malaysia	Legislation	CB
Philippines	Legislation	CB, FSC
Singapore	Legislation	CB

	Mandate established in	Responsible agency
Thailand	Legislation	CB, FSC
Vietnam	Legislation	CB

¹ Australia has two regulators—APRA, the prudential regulator, and ASIC, the business conduct regulator.

CB: Central Bank, DI: Deposit Insurance, FSC: Financial Stability Committee, I: Insurance Regulator, MOF: Ministry of Finance, S: Securities Regulator, IR: Integrated Financial Regulator

Source: Lim, et al. (2013)

In November last year, China announced its intention to set up a financial stability committee within the central bank as a branch of the State Council. China has, therefore, elevated the importance of financial stability monitoring to a State Council level. It is checked by a Vice Premier. The People's Bank of China (PBoC) does the macroprudential surveillance work but they have recognized the importance of filling in between the gaps and looking at shadow banking and so on, which is very big in China. They set up this committee just last year. Just a few weeks ago, when I was in China, they announced that after the NPC meeting, they had merged the China Banking Regulatory Commission with the China Insurance Regulatory Commission. That is in recognition of the various inter-linkages and risks arising from interconnectedness in the non-bank sector. By merging these two commissions, China has tried to fill in the regulatory gaps. The central bank has the power to formulate the regulations and the policies regarding the banks and insurance companies. The merged entity actually has less power than before but they are in charge of enforcing the rules. They are no longer responsible for writing the rules. I must stress that you need to have a structure but it may evolve with the changing structure of your financial system over time as necessary.

Policy Coordination Mechanisms

Most of the countries have a committee. Despite what the table says, there is a committee in Singapore and in Malaysia too.

Table 7.2. Policy Coordination Mechanism

	Existence of Committee	Chaired by
The separate regulator model		
Australia	Yes	CB
China	State council ¹	Prime Minister
Indonesia	Yes	MOF
Japan	Yes	Prime Minister
Korea	Yes	
The central bank model		
Hong Kong, SAR	Yes	MOF
India	Yes	MOF
Malaysia	No	
Philippines	Yes	CB
Singapore	No	
Thailand	Yes	CB
Vietnam	No	

¹The State Council is the highest executive body of the government.
Sumber: Lime, et al. (2013)

No One-Size-Fits-All

There is no one model that works for everyone. There is no one-size-fits-all approach because every country has different circumstances but there

are some common desirables, such as the willingness and ability to act. Other common elements include the need to identify a lead macroprudential authority, involving all the relevant institutions (even if they are unwilling at first), defining a clear mandate and accountability framework, ensuring that the central bank has a major role, providing access to all relevant data and information, putting in place effective cooperation/coordination arrangements and eliminating any Trojan horse that would compromise the autonomy of other policies. There should be no hidden agenda. Systemic risk prevention and crisis management should be supported by separate organizational arrangements. In terms of financial stability, we are talking about two things. One, crisis prevention. Two, crisis management. Usually, crisis prevention is done by the central bank and crisis management is led by the Ministry of Finance.

Country Circumstances

We need to take into account country-specific circumstances, which are important when building a macroprudential policy framework along with the history of institutional arrangements and legal traditions, the political-economic considerations, cultural issues and availability of resources. All models have strengths and weaknesses, for example information sharing, and, therefore, need mechanisms to address possible weaknesses.

Case Studies

Singapore's Case

Singapore is a very small country and the Monetary Authority of Singapore (MAS) performs the functions of a central bank, acts as an integrated supervisor for all sectors and is in charge of developing the financial sector. MAS started the macroprudential function in 2001, with the Financial Sector Assessment Program (FSAP) in 2003. The macroprudential function began with three staff in the Prudential Policy Department reporting

to the Supervision Group Head. When I was there in 2001, we reported to the financial supervision group head, before moving back to the economics department in 2007. For a period of about eight years, it moved back to the economics department and the justification was that economists are needed for their analytical powers. There were not enough people in the supervisory department to do that. Now, however, it has moved back to the financial supervision department. When we first started in 2001, we held a monthly Financial Stability Lunch (working lunch), chaired by the Deputy Governor, to foster collaboration amongst departments. We took an informal approach in order to get more people to buy-in. It was not easy to start the working lunch because previously, we all took separate lunches and it was hard trying to convince people why they should come to this lunch. We canvassed supervisory department heads to join the lunch and encouraged supervisory departments to present papers. We demonstrated the usefulness and power of the Financial Stability Lunch by taking supervisory actions based on careful analysis (stress tests) and financial stability indicators that could signal risk. At that time, we did stress test not just on the banks but also insurance companies. We found that some insurance companies, under stress, fell below their solvency ratios and so there was action taken. That is when the supervisors sat up and had their 'aha moment'. It showed that the Financial Stability Lunch could take important decisions.

In 2002, the Macroprudential Surveillance Department (including the banking data statistics unit) was moved to the Economics Department because of the need for more resources (economists) but conscious that they would have to work closely with supervisors. In 2004, a decision was made to centralize the statistics department under the Economics Department. After the global financial crisis, the Financial Stability Lunch was elevated to become a Financial Stability Meeting, chaired by the governor (managing director in Singapore). The Ministry of Finance and Monetary Authority of

Singapore (MAS) discuss financial stability issues at the MAS/MOF Coordination Forum.

Lessons from MAS. From the Singapore experience, we saw that turf issues are common, even if all agencies are housed under one roof. It is important to recognize this. We know that committees, such as MoUs, do not automatically solve all of the problems. Good relationships are critical because the basis for any good structure is good relationships. They need to like you before they will work with you because we are talking about people with different mindsets. We have to reach out across different work cultures, starting small and informal so people are not intimidated. First, it is important to get buy-in from the very top and announce it, such as getting the governor to chair informal meetings. You can make use of a crisis or FSAP to speed up change but be prepared that the structure will evolve over time.

South Korea's Case

This is also another interesting example, where they have many bodies. The Bank of Korea is the central bank. It has a very advanced model of interbank linkages and liquidity risk, where they do a lot of stress tests, but it does not have a macroprudential mandate. The macroprudential mandate is in the Financial Services Commission (FSC), which makes the policies for the Financial Supervisory Service (FSS) to implement. The Ministry of Finance and South Korea Deposit Insurance Corporation (KDIC) are also involved.

Information Sharing

South Korea has a complicated web of agencies involved in various functions. For information sharing, they use MoUs amongst the various agencies signed in 2009. Data is mostly collected by the FSS (as supervisors) and shared with the KDIC and BoK.

Inter-Agency Councils

First, the Macroeconomic and Financial Meeting, which is a monthly meeting amongst deputies of the MOSF, FSC, KDIC and BoK to review macroprudential conditions and discuss issues on information sharing. Second, the Macroeconomic Policy Council, which is a monthly meeting between MOSF and BoK to discuss current domestic and global economic issues. Macroeconomics, financial stability and supervision are, under the auspices of joint forums. Third, the Supervisory Policy Council, which is a quarterly meeting amongst the BoK, FSC, FSS and KDIC to discuss supervisory and regulatory issues, including joint examinations.

There is mutual participation in the decision-making process. By 2011, the BoK got the mandate for financial stability. There was a rule change and they got the mandate, yet they do not have the instruments. For instance, the FSC will implement loan-to-value (LTV) ratios and debt servicing ratios without consulting BoK, which can cause problems.

Norway's Case

In Norway, there is no formal macroprudential committee. The responsibility for safeguarding financial stability is split between the Ministry of Finance, Norges Bank (central bank) and Finanstilsynet (the Financial Supervisory Authority). The Ministry of Finance has the overall responsibility for financial stability, while Norges Bank and Finanstilsynet monitor the institutions, markets and payment systems to identify threats to financial stability. This is a different situation to that found in Asia. Finanstilsynet is responsible for supervision of institutions and marketplaces. Norges Bank is the lender of last resort. The three authorities regularly publish assessments of financial stability and hold bilateral meetings to discuss stability issues as well as tripartite meetings to secure a common understanding, exchange information and coordinate measures. This is similar to the case in Canada. And it works in Norway because of the close-knit group of civil servants, who primarily graduated from the same university. Furthermore, senior

officials in Norway rotate amongst ministries so there is a better appreciation of the realities and challenges. In the US too, when they first set up the Office of Financial Research (OFR), they made it a point to have people from the Federal Reserve rotate to the OFR every two years. Similarly, people from the OFR and the Treasury rotated to the Federal Reserve. This fosters a kind of common understanding and coherence. Being from different agencies and not knowing one another can be very intimidating but if everyone knows each other and you have worked together, you tend to work better. We always say that in a crisis you must know who to call. Workshops like this, therefore, are very important to get to know each other. Consequently, next time you need something, you can just pick up the phone and call. Therefore, the function of a seminar like this is not just the knowledge, it is also for networking. I am happy to see so many of you talking to each other. That is important because you must have friends on the other side. When a crisis happens, you must know who to call. That is what happens in Norway.

Evaluating Effectiveness

Do institutional arrangements matter for policy effectiveness? Most participants agree that institutional arrangements do matter for policy effectiveness. We have to define what effectiveness is. Later on, in the research that I will show you, effectiveness is measured as a timely response to a problem, like excessive credit growth or excessive house price growth. You can measure effectiveness anyway you like. Financial stability is defined by its very absence. When nothing is happening, it is good. Before the global financial crisis, I was still writing financial stability reports in the Monetary Authority of Singapore (MAS). We were regularly scratching our heads wondering what to write because nothing was happening. Central bankers are not journalists writing sensational headlines but we still need to find some angle and story to write about. What I did was write a paper suggesting to reduce the frequency of the financial stability report to just once a year. To this day, it is still published just once per year.

Since we agree institutional arrangements are important for policy effectiveness, which institutional arrangements are the best for policy effectiveness? There are three choices, where the MOF is most involved, supervisors are most involved, or the central bank plays a central role.

Current Issues

Role of MPMs in Mitigating Systemic Risks Associated With Outflows

Capital outflows should be handled primarily with macroeconomic, structural, and financial sector policies. Outflow controls a last resort: only in crisis situations or when a crisis is imminent. The potential to relax MPMs can give countries an additional set of tools to respond to outflow-related risks, although decisions on relaxation needs to recognize trade-offs.

Relaxation of MPMs can be considered when buffers are in place, outflows are generating financial stress and expectation that releasing the available buffer(s) will work to relieve financial stress and support provision of credit. Trade-offs needs to be considered carefully, as relaxation can reduce resilience to future shocks, and should consider the need to maintain confidence and regulatory minima. Building larger buffers ex ante can create policy space.

That is why it is a very interesting and very challenging area. Remember, they are also losing a lot of reserves. The reserves fell from USD4 trillion-USD3 trillion. There was also depreciation of the renminbi and that stopped after they introduced the measures. Intervention would have shown up in the reserves. Now, China is rebuilding its reserves again. Macro prudential policy is now part and parcel of this holistic approach to strengthening the system before liberalization.

What Is The Role Of Macroprudential Policy In The Liberalization Process?

Greater capital flow liberalization should be supported by progressive strengthening of capacity to deploy macroprudential tools along the sequence of steps envisaged under the integrated approach, particularly in the context of the liberalization of banking and portfolio debt flows. The whole thing is really about sequencing, starting with FDI flows, long-term rather than short-term and so. Talking about China, the way China has done it is to follow this approach. FDI first, inflows and then outflows, long-term before short-term and so on before the portfolio flows. The capacity to deploy tools effectively requires adequate institutional arrangements and toolkits as well as information to assess risks and calibrate policy tools appropriately. Where supervisory capacity or relevant data to operationalize macroprudential policy are lacking, this would argue for caution with further liberalization.

Singapore opened up to trade. We opened up to non-financial corporations and alongside that we need the financing. We started developing the financial sector by opening the Asian dollar market. That is an offshore US dollar market. That was 50 years ago in 1968. After we did that, it was impossible to keep our capital account closed. I would not say that we strengthened our supervision first, we were still very young and learning as a nation. From the start, however, the idea was very strong supervision and regulation were required to buttress the impact from opening up. No foreign banks were granted a license easily at that time. A lot of things do not happen in a vacuum. You need policy support. That is easier said than done. We did not get into a crisis despite opening up because a lot of other policies were in place, not just supervisory policies. Strong macroeconomic policies are also required along with a framework and a monetary policy regime that is consistent with your exchange rate regime and consistent with your degree of capital account openness. This all needs to be in place in order to be crisis free. I am sure there are examples from around the world but I am mostly dealing with Singapore. It was actually very early on in our development process that we opened up. Strengthening the framework does not just mean

the regulation and laws but how you supervise, namely your supervisory capacity. Having a good macroprudential institutional framework in place is very important nowadays to support further liberalization. This is the crux of it.

Macroprudential Measures versus Capital Flow Management Measures

MPMs

A lot of you have asked what the difference is. Let us look at this in some detail. MPMs are about building resilience and containing systemic risk. They are not designed to limit capital flows. That is the first distinction. MPMs are not targeted at capital flows per se, they target the housing market and the banks, not capital flows. MPMs can help limit systemic risk from capital flows even when not designed to limit capital flows. The policy approach should be well calibrated and targeted to contain systemic vulnerabilities based on an assessment of systemic risk arising from capital flows, not broad-based. A broad range of MPMs may be needed to attain the objectives, including countercyclical buffers, spot based, targeted, sectoral, liquidity tools and so on. MPMs are usually prudential tools, which are precautionary by nature, such as loan-to-value (LTV) ratios.

CFMs

Capital flow management measures were designed to target capital flows. The institutional view of the IMF, as of 2012, considers a broad macro policy package to handle capital flows. CFMs should be used as a last resort. The 3Ts of CFMs are transparency, targeted and temporary. CFMs should also be non-discriminatory. The two types of CFM are residency-based and currency-based CFMs. Residency-based CFMs are considered discriminatory. Therefore, the IMF prefers currency-based CFMs. CFMs target inflow or

outflow. CFMs on inflows are only applicable during capital flow surges, beyond a certain threshold. CFMs on outflows are only applicable during imminent crisis situations. That is why the IMF considers CFMs as a last resort. CFMs can be appropriate in certain circumstances, but typically during an imminent crisis. This is a bit controversial.

Distinguishing Between MPMs and CFM/MPMs

For a measure to be assessed as an MPM it needs to be geared towards containing systemic risk. This hinges on two conditions:

- the identification of a potential source of systemic risk that needs to be addressed;
- the identification of a path of transmission of the measure along which the measure can reasonably be expected to contribute to a reduction in systemic risk.
- In the housing market, for instance, perhaps foreigners have been identified as the source of risk. Therefore, a measure is deployed targeting foreigners, for example a stamp duty for foreigners. That has a higher chance of being effective.

All relevant information and circumstances should be considered to help guide the determination of whether an MPM is also a CFM, namely a measure designed to limit capital flows. This is a grey area...video skips again...Residents and non-residents, so it could be considered a CFM. Thus, seemingly similar measures in different countries could be assessed differently and a measure that is initially an MPM may become a CFM/MPM. CFMs are a last resort but MPMs should be implemented pre-emptively.

Appropriate Use (Institutional View)

An MPM can be put in place pre-emptively before an inflow surge occurs or permanently to limit systemic risk. Furthermore, MPMs can also be

tightened in response to increases in risk, for example in the context of a surge. The keyword here is ‘surge’. You must first determine an inflow surge. In other words, an abnormally high inflow, higher than historical levels. A CFM/MPM may be useful to limit systemic financial risks stemming from a capital flow surge, provided that they are not used as a substitute for necessary macroeconomic adjustment; they are the most effective, efficient and direct, and the least distorted; they seek to treat residents and non-residents in an even-handed manner. A CFM/MPM may be maintained until after the capital flow surge abates but their usefulness relative to their costs needs to be evaluated on an ongoing basis. A key part of the assessment is whether there are alternative measures to address the systemic risk that are not designed to limit capital flows.

Case 1. Reserve Requirements on Inflows into the Government Bond Market

Is this an MPM or CFM? Is it appropriate?

Circumstances:

Capital inflows into country A are limited relative to historical averages, but they are nevertheless pushing down bond yields as the market is rather illiquid and flows are weakening the effects of monetary policy tightening on long-term interest rates

The exchange rate is a bit overvalued, the economy is overheating, fiscal policy is neutral, monetary policy has been tightened, and FX interventions have resulted in more than adequate FX reserves.

The financial system is well protected with prudential measures.

Policy response:

A special one-year, 40 percent reserve requirement on portfolio flows into the government bond market is introduced to safeguard adequate transmission of monetary policy and thereby macroeconomic stability

8. The Linkage between Monetary and Financial Stability: Some Policy Perspectives

Solikin M. Juhro

Preview of Monetary Stability and the Financial Stability Nexus

Discussion of issues concerning financial stability becomes as important as monetary the issues of monetary stability since the onset of the global financial crisis of 2008/09 (GFC). There is a variety of definitions related to monetary and financial stability. The broadly accepted definition of monetary stability in academic circles and for the central bank is a condition that guarantees the attainment of price stability as defined by low, stable prices (subdued inflation). The factual basis for this lies in the important role that price changes play in the process of adjustments and decision-making by economic agents. However, a clear understanding of financial stability is missing due to the absence of agreement on a definition. In this respect, Mishkin (1990) defines financial stability as a condition in which the financial sector guarantees efficient allocation of savings and investment in a sustainable manner and without significant disruption, but this definition is considered too broad. A more easily discernible definition is used in analysis, in which financial stability is a situation marked by stable asset prices and the absence of banking crises, with market interest forces transmitted readily into interest rates (Issing, 2003). In this paper, financial stability is understood more in line with the latter definition.

Given the definitions of monetary stability and financial stability, there is a question regarding their nexus: are the two mutually supportive (complementary) or do they work against each other (substitute) in the sense of a trade-off? The conventional view is that monetary stability supports financial stability. Nevertheless, the main proponents of this view regard monetary or price stability as more of a 'sufficient condition' for financial

stability (Schwartz, 1995). This view assumes that inflation is one of the main factors behind financial market instability. A related opinion is that inflation increases the likelihood of misperceptions concerning future income achievement and exacerbates the problem of asymmetric information between lenders and borrowers. In another view, high inflation also encourages high price fluctuations, which create business uncertainty and even banking crises.

This argument is consistent with the reverse relationship, in which a banking crisis will trigger monetary instability. In this respect, a twin crisis involving the banking system and the exchange rate will cause an unexpected or even reversed monetary policy impact (Goldfajn & Gupta, 2002). In a crisis involving only the exchange rate, tight monetary policy has the potential to stabilise the exchange rate, prompt a reversal through changes in the nominal exchange rate and stabilise the financial sector. However, in a banking crisis, the opposite will occur, whereby a tight monetary policy stance will reduce the probability of a reversal. In this situation, several factors will influence the monetary policy response, such as the extent of the currency mismatch at domestic banks and the discretionary powers of the central bank in supplying liquidity in a crisis situation.¹ The difference in the nature of the relationship during different crises is in accordance with the conventional view that there is generally no trade-off between monetary stability and financial stability.

The 'new environment' hypothesis, however, suggests such a trade-off based on the proposition that successful inflation control by the central bank could foster overly optimistic market perceptions and forecasts for the future of the economy. Incorrect perceptions create a false sense of security and lead to miscalculations of asset values with possible future negative impact. Borio,

¹ As transpired in Indonesia, the complexity of problems during the twin crises in 1997/98 undermined the effectiveness of monetary policy responses. This was reflected not only in high interest rates, but also massive liquidity flows.

et al. (2001) indicates that the combination of increased asset prices, high economic growth and low inflation within the context of a stabilisation programme could foster exaggerated expectations of future economic performance. Overoptimistic expectations could lead to drastically escalating activity on the asset and credit markets that surpasses the level of potential productivity improvement. This in turn drives up asset prices and fuels a booming trend along with inflationary pressures. At this stage, there is little empirical evidence to support such a proposition.

Issing (2003) analyses the trade-off by taking into account the time horizon to ascertain whether the trade-off is short term or long term. In this respect, the trade-off possibly arises in the short term, during a period of sudden disinflation (inflation below the predicted rate). In the 'new environment', this could precipitate fragility because of its effect on driving down nominal interest rates, which further exacerbates moral hazard in the form of increased high-risk lending in a low interest, low inflation environment. In some cases, in a very low inflationary environment, this opens the possibility to an asset price bubble. However, the fragility in the disinflation period will tend to be short-lived. Not only will the economy adjust itself to the low inflationary environment, but the central bank is also likely to raise nominal interest rates to curb inflation of asset prices caused by excessive investment and in so doing prevent long-term inflationary pressure and any resultant economic crisis. Thus, within the context of the forward-looking central bank mandate of building price stability with a view to the horizon (medium and long term), this conflict will disappear of its own accord.²

² From another standpoint, because of the threat posed by financial instability to inflation stability in the medium and long term, the price stability focus of central bank actions must consider financial stability. The implication of possible short-term conflict certainly does not overrule the conventional wisdom that price stability promotes financial stability.

In subsequent discussions, especially at the onset of the global financial crisis of 2008/09, Borio and Zhu (2008) put forward the existence of the 'risk-taking channel' and suggest three mechanisms to explain this new channel. *The first* relates to valuation factors, income and cash flows. Under this mechanism a decline in interest rates would increase the evaluation perception on asset prices and profit potential. In this context, a decline in interest rates is parallel to the perception of a rise in profit potential and cash flow. What emerges from this behaviour is a rise in risk-taking behaviour by economic players when the monetary policy stance is loose. *The second* mechanism corresponds to the correlation between interest rates and the target (nominal) rates of return. This mechanism is in line with the assumption that a decline in interest rates would increase the money illusion towards asset ownership attributable to a sticky rate of return. Similar to the first mechanism, this will subsequently encourage risk-taking behaviour. *The last* mechanism relates to the positive effect of transparency from central banks. In this respect, greater transparency or central bank commitment would reduce future uncertainty and lower the risk premium, consequently improving risk-taking behaviour.

Some empirical studies support the argument of a risk-taking channel in the monetary policy transmission mechanism. Altunbas, et al. (2009), for instance, find evidence that unusually low interest rates over an extended period of time cause an increase in banks' risk taking, although further analysis is required concerning to what extent monetary policy or the general level of interest rates is significant for the banks' risk-taking. De Nicolo, et al. (2010) also suggest that monetary policy easing will increase risk taking but this relationship depends on the health of the banking system, i.e. less so for poorly capitalized banks. These findings bear on the policy debate on how to integrate the monetary and macroprudential policy framework to meet the dual objectives of monetary stability (price) and financial stability. This issue becomes particularly relevant in the future, given the fact that the nexus

between monetary and financial stability, whether they are substitutes or complements, will depend on the types of shocks to the economy as well as the role of portfolio effects and risk shifting that force the banks' condition.

This paper explores background issues on the linkages between monetary and financial stability from central banking policy perspectives. The following section presents financial sector behaviour and monetary policy effectiveness, touching mainly upon financial sector characteristics that could potentially exacerbate macroeconomic instability by developing output fluctuations (procyclicality) and their implication on the workings of monetary policy. The third section elaborates the need to integrate the monetary and financial system stability framework, including the implementation of macroprudential policy in several countries. The fourth section provides the policy instrument mix as a key strategy to implement the monetary and financial system stability framework. It elaborates objectives and policy mix variations, as well as explores some technical aspects of implementation. The last section derives conclusions and implications, especially concerning the adjustment of the central bank's mandate and its consequences on policy governance.

Financial Sector Behaviour and Monetary Policy Effectiveness

The previous section posed the importance of the financial system for the monetary policy transmission mechanism, implying the need for the central bank to better understand the linkages between the financial sector and monetary policy. This issue has become increasingly pronounced, especially since the Global Financial Crisis of 2008/09. The crisis provided a key lesson that the financial sector plays a crucial role in macroeconomic stability because of its behaviour that triggers excessive procyclicality.³ Due

³ Procyclicality is defined as a character of the financial sector that follows economic activity. Through the work of the financial accelerator, it further pushes an economy to grow faster when in a cycle of expansion and weaken during a period of contraction.

to its procyclical nature, the financial sector could potentially compound macroeconomic instability by amplifying output fluctuations. The procyclical characteristic of the financial sector is inherently attributable to a number of factors. *Firstly*, asymmetric information in the financial market that triggers the financial accelerator. With this kind of market characteristic, when the economy is in a contractionary period and collateral values are low, even a sound corporation with a profitable project would find it difficult to access credit. Conversely, when economic conditions improve and collateral values increase, the same corporation would regain access to banks, thereby adding to economic stimuli. Although the financial accelerator is the main mechanism behind the occurrence of procyclicality, disproportional responses of market players in perceiving risks also contribute to the worsening of procyclicality (Borio, et al., 2001).

Procyclicality is not just the result of interactions between the business cycle and financial cycle; it is also affected by the risk-taking cycle, which is a characteristic marked by over-optimism during economic booms and over-pessimism in times of economic bust (Nijathaworn, 2009). The interaction of the three can typically be described in the context of a boom-bust cycle. Initially, when the economy moves during an expansionary phase, characterised by macroeconomic stability and escalating growth, investor confidence raises optimism when assessing the economy. This will lead to the risk-taking behaviour, which will eventually push up credit demand and asset prices.

Table 8.1. Interaction between the Business Cycle, Risk Behaviour and the Financial Cycle

	Business Cycle	Risk-Taking Cycle	Financial Cycle
Expansionary Phase	Macroeconomic stability Increased economic growth	Confidence and Optimism up Risk-taking up Credit demand up	Risk value down, interest rate spread narrower Asset prices up, pushing up collateral value Leverage up

	Business Cycle	Risk-Taking Cycle	Financial Cycle
			Foreign capital inflows up Credit extension up
Contractionary Phase	Heightened macro volatility Decreased economic activity	Market confidence down Risk averse Credit demand down	Bank deleveraging Loan loss provisions up Interest rate spread wider Credit extension down Capital inflows down

Source: Nijathaworn (2009), edited.

During this optimistic period, risk in the financial sector eases, lending rate spread narrows and risky asset allocation is reduced as banks prefer to apply a short-term perspective to a longer-term one. Surging asset prices push collateral values up thereby boosting credit expansion. This further improves market confidence and encourages risk-taking behaviour, reflected by soaring leverage. Greater credit expansion compels corporations to boost investment and households to raise consumption, further lifting economic growth. Conversely, when confidence in the economy dwindles, investors become risk averse. As a result, asset prices drop, causing collateral values to fall. Banks respond by deleveraging, shifting their portfolio from high-risk credit to low-risk assets, such as central bank certificates and government bonds, in a bid to maintain capital adequacy. Reserve allocation is also expanded to anticipate deteriorating credit quality. Such conditions undermine credit expansion, which, in turn, harms the economy.

Secondly, procyclicality may also emerge in line with the characteristics of financial sector regulations, which are inherently procyclical. For instance, the rules on capital and provisioning determine a softer requirement on banks during a period of economic boom or expansionary phase. One of the rules governing the banking sector that is deemed procyclical is Basel II. Basel II specifically aims to strengthen risk management at banks. However, it also poses a procyclical impact as the Basel II Framework indirectly encourages

banks not to accumulate additional capital while banking and economic conditions are prospective, and to raise capital when such conditions deteriorate. Consequently, in the event of a crisis, banks are required to increase their capital ratio, but they are forced to seek funding in a limited capacity, which may further worsen the banks' condition. In addition, the Internal Rating Based approach under Basel II demands that capital requirements be based on a bank's estimation on the possibility of default of its loans and related losses, as both tend to increase during a crisis period. This may exacerbate the impact of a crisis on credit supply and the economy overall.

Furthermore, accounting standards are suspected of contributing to procyclicality. According to accounting standards that assess a bank's balance sheet components on the basis of the market value approach, if the economic situation is improving, the value of the assets or the performance of banks will also be considered improving so that banks are not required to have a high capital requirement and provision. In such a situation, banks are inclined to make expansive moves. However, in the event of a crisis or during a contractionary period, asset value would fall but the bank would not be able to use its capital or risk provisions immediately to maintain balance sheet conditions. This would subsequently lead to worsening conditions and potentially pose systemic risk in the banking sector.

Empirically, procyclicality can be observed through the development of bank credit during both expansionary and contractionary periods. Observable correlations between average credit growth and economic growth indicate that the higher the economic growth is, the higher the average credit growth would be. Moreover, credit growth was observed to outpace GDP growth during an expansionary period and grow slower during an economic downturn. Table 2 presents procyclicality in several Asian countries measured by the correlation coefficient of GDP and real credit.

Table 8.2. Procyclicality of Real Credit and GDP in several Asian countries

Countries	Correlation Coefficients
Indonesia	0.82
Malaysia	0.51
Philippines	0.33
Thailand	0.32
Australia	0.26
Japan	0.48
China	0.31
Hong Kong SAR	0.30

Source: Craig, et al. (2006)

The complexity of problems accompanying procyclical behaviour in the financial sector ultimately takes its toll on the efficacy of the monetary policy transmission mechanism. Mishkin (2009) stated that monetary policies potentially tend to be more efficient during economic crises rather than during normal times, thereby providing a basis to carry out macroeconomic risk management to deal with the problems related to economic contraction during times of crisis. This statement shows a link between monetary stability and financial sector stability.⁴ Some empirical observations support the close correlation between financial sector behaviour and the monetary policy transmission mechanism. Nier and Zicchino (2008) discovered that bank credit supply is affected by monetary policy stance that interacts with balance sheet stress and is then transmitted through bank losses. They concluded that

⁴ As mentioned in the early part of this section, Borio and Zhu (2008) explain the importance of the risk-taking channel within the monetary policy transmission mechanism. The risk-taking channel, in contrast to the financial accelerator concept discussed by Bernanke and Gertler (1999), affects bank credit supply through the banks' decision to extend credit in accordance with the banks' behavioural changes to credit risk. In connection with this, empirical studies have provided sufficient evidence of the existence of the risk-taking channel within the monetary policy transmission mechanism.

the repercussions of interaction between the monetary policy stance and bank losses grow stronger during a crisis period, assuming that the magnitude of financial sector risk will escalate in the case of an economic crisis.

Figure 8.1. Monetary-Financial Stability Linkages and the Monetary Policy Transmission Mechanism

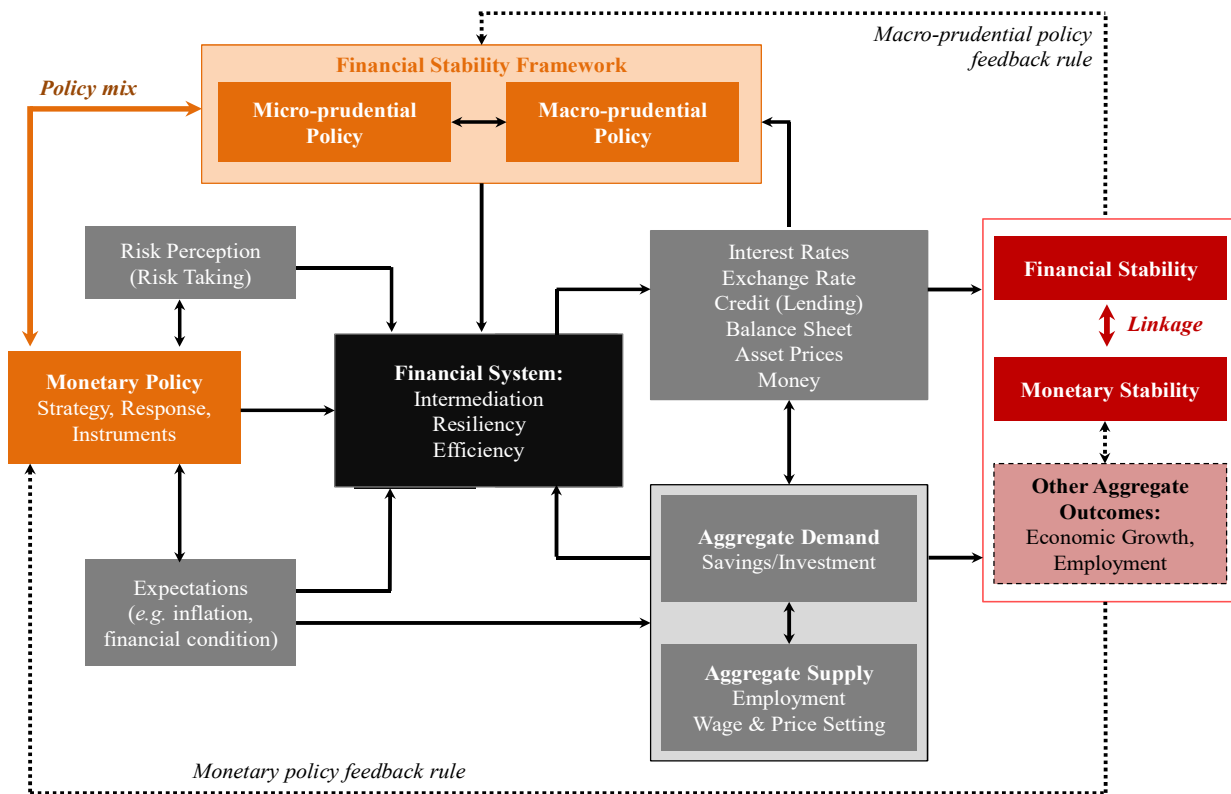


Figure 1 describes the workings of the transmission mechanism in the presence of risk perception (risk taking). When the economy experiences an expansionary phase, characterized by macroeconomic stability and escalating growth, investor confidence raises optimism when assessing the economy. Such risk-taking behaviour, which is initially triggered by monetary policy, will eventually drive up credit demand and asset prices. Changes in the financial sector, as reflected in adjustments of financial variables (financial stability), influence aggregate outcomes such as economic growth and employment, which are directly linked to monetary stability. This is where the linkage between financial stability and monetary stability occurs. A

healthy macroeconomic environment and monetary stability has bidirectional feedback with financial system stability. Any developments between monetary and financial stability will be considered by monetary policymakers through the macro-prudential policy feedback rule, which is scrutinised under the financial stability framework.

Within this policy perspective, in order to strengthen the framework of monetary and financial system stability, the central bank must be more flexible and creative when responding to emerging uncertainties within the economy and to think beyond public perception. Such flexibility is not only linked to the adjustment preference to control inflation and manage the macroeconomy on the one hand, and the role of financial system stability on the other, but it is also crucial to overcome the conflict potential or “trade-off” between targeting monetary stability and financial system stability itself.

Integration of the Monetary and Financial System Stability Framework

Empirical facts show that the macroeconomic stability achievements attained during the period of great moderation between 1987 and 2007 would not automatically isolate the global economy from the impact of crisis, which was generated by financial sector susceptibility. Therefore, central bank policy formulation should simultaneously evaluate the strategic role of monetary policy and the financial system. Dynamics during financial crises have shown that monetary policy needs to be further directed towards anticipating macroeconomic instability risk stemming from the financial system. This implies that healthy macroeconomic management should also consider financial system stability as the foundation to realise a sustainable macroeconomic environment. *“There is no macroeconomic stability without financial stability”.*

Within this policy perspective, in order to strengthen the framework of monetary and financial system stability, the central bank must be more

flexible and creative in responding to emerging uncertainties within the economy and to think beyond public perception. Such flexibility is not merely linked to the adjustment preference to control inflation and manage the macroeconomy on the one hand, and the role of financial system stability on the other, but it is also crucial to overcome the conflict potential or “*trade-off*” between targeting monetary stability and financial system stability itself.⁵ In this connection, policy implementation flexibility can be achieved through additional instruments (in this case macroprudential instruments) in addition to establishing a longer time horizon to reach the inflation target in order to accommodate output stabilization in the near term. In connection with the measures to overcome potential policy conflict, it is no less important to prioritize the policy goal, for example by setting price stability as the overarching policy goal.

Urgency to strengthen the monetary and financial system stability framework requires strong financial infrastructure along with an adequate examination and supervision function to support domestic market integration into an increasingly complex financial system. To that end, Borio (2003) emphasizes the need to strengthen the regulatory framework or macroprudential policy, thereby limiting the risks when the financial market confronts intense pressures for a protracted period of time, which may force real output within the economy to tumble.

Conceptually, macroprudential policy is a prudential regulation instrument aimed at enforcing financial system stability as a whole, instead of the individual wellbeing of financial institutions. Analogically,

⁵ The occurrence of a trade-off between reaching monetary and financial system stability depends on the type of shock (Geraats, 2010). If the shock originates from the demand side, efforts to stabilise prices and the financial system will generally move simultaneously. Central banks may adjust the interest rate to cope with shocks in aggregate demand in a bid to stabilize not only the output gap, but also prices of goods and assets. Meanwhile, shocks stemming from the supply side tend to have a reverse effect on price and financial system stability. This happens, for instance, when shocks on the supply side move positively by suppressing inflation but lifting output. Under such conditions, expansive monetary policy will likely propagate asset prices bubbles.

microprudential policy is a prudential regulation instrument intended to maintain the health of individual financial institutions.

Macroprudential policy seeks to develop, oversee and deliver appropriate policy responses to the financial system as a whole. It aims to enhance the resilience of the financial system and dampen systemic risks that spread through the financial system (Group of Thirty, 2010).

Therefore, macroprudential policy is used to prevent *boom-bust cycles* of credit supply and liquidity, which may lead to economic instability. With its role in terms of maintaining stable financial intermediation supply, macroprudential policy backs the monetary policy goal of maintaining price and output stability.⁶

In a later development and in line with the changing financial sector arrangement, especially in the post-2008/09 crisis period, many central banks have applied macroprudential policy instruments covering a broader scope. In this connection, several instruments previously better known as microprudential instruments (such as *loan-loss provisioning requirements*, or *loan-to-value*) or monetary instruments (such as *reserve requirements*) were also used to prevent systemic risk and to maintain financial system stability in the economic activity cycle. Such policy instruments are not focused on efforts to deal with risk at an individual bank. Therefore, these policy instruments

⁶ There are two important dimensions of macroprudential policy. *First*, the *cross-section* dimension, which shifts the focus of prudential regulation applied on financial institutions individually to the regulation system as a whole. The history of financial crises shows that most of such crises occurring around the world were not caused by problems at an individual bank, which subsequently infected the system as a whole. On the contrary, major crises in the past were caused by exposure to macro-financial instability conducted simultaneously by most actors within the financial system. Therefore, a more holistic view on the financial system and its correlation with the macroeconomy through various sides is urgently required. The second dimension is the *time-series* one, namely macroprudential policy that aims to restrain the risk of excessive procyclicality within the financial system. In this context, macroprudential policy should be specifically designed to eliminate, or at least mitigate, procyclicality. Principally, it is about how to encourage the financial system to prepare an adequate buffer when economic conditions improve, or when financial system instability generally occurs, and how to use that buffer during an economic slump.

could be categorized as policy instruments in a wider macroprudential perspective. Several macroprudential policy instruments used in a number of countries are presented in Table 3.

Table 8.3. Macroprudential Policy Implementation in several Countries

Problem	Instrument	Countries
Leverage (procyclicality potential)	Risk-weighted adjustment of capital regulations	India, Indonesia, Malaysia, Estonia, Ireland, Portugal, Norway
	Application of capital to risk-weighted asset ratio	India, Bulgaria, Croatia, Estonia, Australia
Credit (Correlation and characteristics of borrowers, pressure over macro stability)	Application of <i>countercyclical provisioning</i> (provisions for certain credit)	China, India
	Limitations of <i>loan-to-value ratio</i> on certain sectors (with potential bubbles)	China, Hong Kong, Korea, Singapore, Malaysia, Thailand, Bulgaria, Norway, Portugal, Rumania
	Credit limitations to certain sectors (such as property, credit cards)	Korea, Malaysia, the Philippines, Singapore, Thailand, Rumania
	Changes in <i>reserve requirements across the board</i> or specific targets	China, India, Indonesia, Korea, Malaysia, Finland, Estonia
Liquidity (risk potential on certain aspects)	Buffer application to minimize reliance on risky funding sources	India, Korea, the Philippines, Singapore
	Application of <i>loan-to-deposit ratio</i>	China, Korea, Indonesia

Source: Borio and Shim (2007), Hannoun (2010), Group of Thirty (2010)

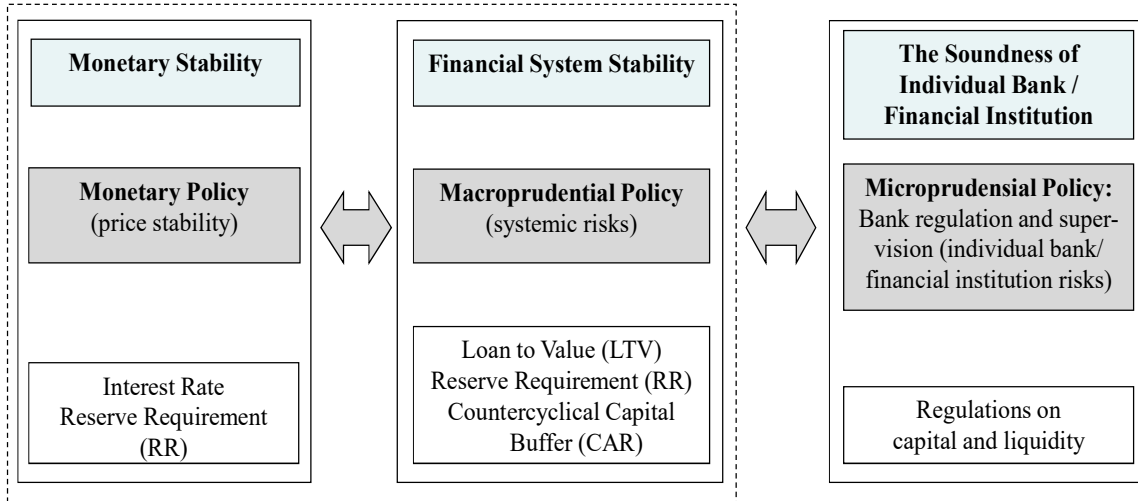
Strengthening the monetary and financial system stability framework requires appropriate monetary and macroprudential policy integration. As is known, the main goal of monetary policy is to maintain price stability. To attain this goal, central banks traditionally use the interest rate as their primary instrument. However, maintaining price stability is still not sufficient to guarantee macroeconomy stability, as a financial system with its procyclical behaviour triggers excessive economic fluctuations. Meanwhile, the goal of macroprudential policy is to guarantee financial system resilience as a whole in a bid to support financial intermediation for the economy as a

whole. With its countercyclical role, macroprudential policy supports the goal of monetary policy in terms of preserving price and output stability.

The objectives achieved through monetary and macroprudential policies are mutually reinforcing. Steps to empower financial system resilience will also improve monetary policy, including protecting the economy from sharp fluctuations within the financial system. On the other hand, macroeconomy stability will reduce financial system vulnerability due to procyclicality. In general, therefore, the interest rate may not need to move at a magnitude usually required in times of no policy integration or coordination. Meanwhile, macroprudential policy affects credit supply and, consequently, monetary policy transmission. The effectiveness of policy coordination definitely relies on the macroeconomic environment, financial conditions, the intermediation process as well as the level of capital and assets in the banking system. Hence, it is not realistic to expect the combination of monetary and macroprudential policy to be fully capable of eliminating economic cycles. The main goal of such policy integration is to moderate cycles and bolster financial system resilience at a macro scale.

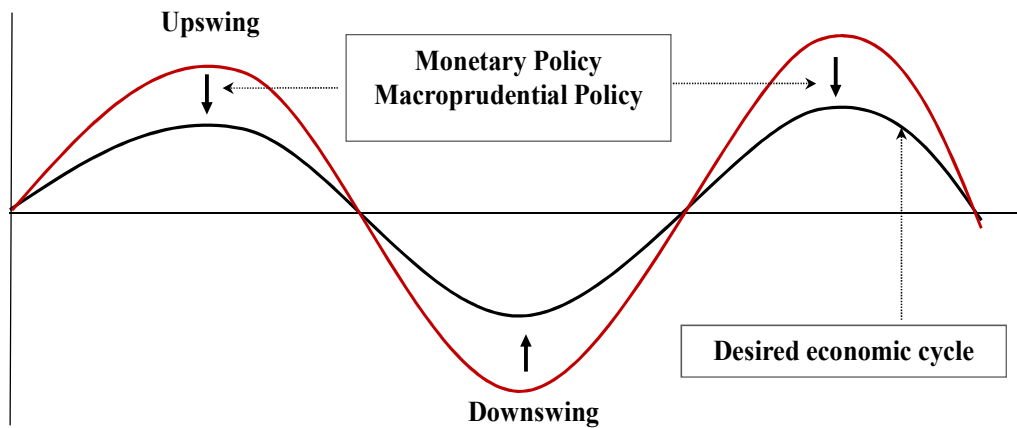
Improvement of the monetary and financial system stability framework, through monetary and macroprudential policy integration, is illustrated in Figure 2.

Figure 8.2. Integration of Monetary-Macroprudential Policy



Such monetary and macroprudential policy can be described as follows. Macroprudential policy aims to tighten capital and the liquidity requirement during an economic upswing, thus compelling banks to rein in credit growth in an effort to build up resilience and anticipate a future economic slump. In this condition, efforts to maintain banking sector resilience will simultaneously underpin the monetary policy goal of stabilising credit supply. Therefore, the objective of such macroprudential policy, with its countercyclicality, will synergize with the goal of monetary policy, namely to reduce excessive economic fluctuations.

Figure 8.3. Monetary and Macroprudential Policy to Dampen Procyclicality



Several conditions are required to make the integration of monetary and macroprudential policy run well. Firstly, there is a need to understand the framework of the linkages among monetary policy, macroprudential and microprudential policies. This is to take into account the conflict potential to reach the objective of the policy. That is why the use of an instrument mix or adding new instruments could be considered as the right alternative move. Secondly, there is a need to understand the workings of monetary and macroprudential policy transmission in terms of affecting economic activity. This requires a more integrated analytical framework, especially when evaluating the important role of the financial sector. Thirdly, there is a need to measure the right risk behaviour indicators to support risk system monitoring. Measuring the risk indicators in addition to supporting the right monitoring system will also strengthen the analysis of the transmission mechanism through the risk-taking channel.

Policy Instrument Mix as a Key Strategy

The Objectives

On an ideal financial market, the central bank typically relies on a single instrument to reach the monetary policy goal. In reality, however, market imperfections are always present, such as those relating to banking structure and soundness, the distribution gap in market liquidity and excessive market fluctuations. Imperfections force the employment of an instrument mix and wider operational procedures to support the effectiveness and efficiency of monetary policy implementation.

Empirically, the variations when employing an instrument mix are based on several considerations (Balino & Zamalloa, 1997). *First*, to secure the achievement of monetary management in terms of weathering the turbulence that distorts the supply and demand of banking reserves. *Second*, to adapt to instrument and operational procedures in line with institutional constraints affecting the work of an instrument. *Third*, to gain the objectives of other

policies deemed crucial and supportive to the work of the monetary policy transmission mechanism. *Fourth*, to adjust to the macroeconomic policy environment, especially to the type of monetary and exchange rate regime. Referring to the *Tinbergen rule*, it is said that for each and every policy target there must be at least one policy tool, therefore the application of instrument mix is deemed necessary in case of a change in economic conditions along with the corresponding challenges, which also support the policy objective enlargement targeted by policymakers.

In this connection, besides the availability of several policy instruments, of most significance is how to mix or coordinate the application of the instruments to raise policy effectiveness in terms of supporting general economic development. This is to consider that each instrument has its own unique timing and magnitude characteristics. In a later development, the application of an instrument mix has become a trending practice at many central banks. In this regard, the type of mix is not merely limited to monetary policy instruments, but also tends to include a mix of monetary policy instruments and other policy instruments, such as those of macroprudential policy. With a different policy umbrella, it is not a simple task to formulate the correct kind of mix.

Policy Mix Variations

As previously mentioned, the complexity of problems generated by the 2008/09 global financial crisis has raised awareness that the role of the financial system should be taken into account in monetary policy formulation. For instance, the decision has to be made as to whether or not monetary policy is required in response to asset price developments that potentially lead to financial market imbalances. Apart from the growing debate over such an issue and despite that monetary policy is crucial in terms of controlling financial sector imbalances, this does not mean that asset price stability, for instance, should be an explicit target of monetary policy. This is

to consider that monetary policy itself is not capable of controlling asset prices, especially when asset price speculation contributes to surging prices, thereby precipitating an extremely high return on assets. Under such conditions, any changes in the interest rate would fail to affect investors' portfolios, especially against those investments within the financial market. An across-the-board interest rate hike would 'overkill' the economy as a whole.

Therefore, monetary policy requires additional supporting instruments to control the surge in asset prices on the financial market. In this case, countercyclical macroprudential policy instruments could be utilised to overcome procyclicality and backup monetary policy to achieve macroeconomic stability. One example of a macroprudential instrument that would complement the interest rate in terms of managing asset prices is the Loan-to-Value (LTV) ratio, namely the ratio of money borrowed on a property to the property's fair market value, which aims primarily to fend off asset bubbles in the housing sector. To that end, LTV is set at a certain limit (for instance at a maximum of 80%), which is generally considered as a norm or a reference in credit expansion for real estate development and is safe enough from a macroprudential point of view.

An instrument mix is also applicable to quell the complexity of problems accompanying the prolonged economic recovery in advanced countries, which propels an influx of foreign capital into emerging countries. In certain countries, such as China, India and Indonesia, the foreign capital inflow phenomenon complicates efforts to oversee soaring liquidity on domestic financial markets. Greater excess liquidity could potentially accelerate credit growth and compound inflationary pressures on the monetary side. Due to such complexity in the form of distortions in both external and internal imbalances, the role of the interest rate instrument turns out to be extremely limited.

An interest rate hike as a measure to control economic liquidity by a central bank would eventually be offset by the significant force of foreign capital inflows, which leaves efforts to oversee macroeconomic stability ineffective. This offsetting phenomenon repeats itself as a vicious circle of capital inflows. Under such conditions, monetary policy transmission taken through the interest rate channel would face constraints, especially over the workings of the term structure interest rate hypotheses. In this case, the development of monetary aggregates, including credit, tends to be inelastic to interest rate performance. For that reason, if the interest rate is used as a monetary instrument, the complexity of the problems requires the use of other instruments (non-interest rate) as a backup to optimally reach the goal of monetary policy.

There are several examples of an instrument mix that support the role of the interest rate, for instance the reserve requirement (RR). The modification of RR in domestic exchange is often seen as a part of those instruments to implement monetary and exchange rate policy. Evaluating the phenomenon of how developing countries responded to rapid inflows of foreign capital, the attention has been focused more on the use of RR to moderate the financial cycle. Adjustments to RR could be used to supplement or replace the use of an interest rate instrument to control the impact of credit on the economy. In a later development, a number of countries also applied RR to their foreign exchange based financing provided by financial institutions. In this case, macroprudential issues are closely related with currency mismatch and vulnerability of foreign exchange liquidity within the banking system, which may also be caused by the financing scheme itself. Additionally, RR variation has been applied based on a specific consideration. In general, the application of RR variation is for macroprudential purposes under a condition where the credit market is segmented and dominated by intermediation institutions, which is tightly regulated. Although the same impact may be generated from the application

of the interest rate instrument, the use of RR can be classified as a more direct way to influence banks' funding costs and capacity in triggering financial market imbalances.

The forms of instrument policy mix applied by many central banks are also varied. One form is through reliance on foreign exchange market intervention, which is generally related to accumulating foreign exchange reserves in a bid to manage the external balance. Under a flexible exchange rate regime, central banks intervene on the foreign exchange market to dampen exchange rate volatility and/or to accumulate foreign exchange reserves. This has been evidenced by foreign exchange reserve assets growing with rapidity over the past decade. Yet, foreign exchange reserve accumulation bears its own costs. On one hand, foreign exchange reserves can be seen as a macroprudential instrument to enhance resilience during an episode of financial market distress. On the other hand, however, persistently large foreign capital inflows along with a surge in central bank foreign assets almost always enlarge the banking system balance, which would eventually lead to a credit and asset price boom, culminating in a crisis.

The use of macroprudential instruments thus raises a question over how such instruments connect with interest rate policy; whether as a complement or a substitute. It is understood that the use of both instruments is a tactical way to influence financial sector conditions. Macroprudential instruments work by influencing financial sector incentives and resilience and directly impact the monetary policy transmission mechanism. Such instruments work by either strengthening or weakening policy repercussions, which are ultimately reflected in the accessibility and the cost of borrowing faced by debtors (private and public). From this point of view, such macroprudential instruments fall into the complementary category. For instance, in terms of weathering intense inflationary pressures, rapidly growing credit and soaring asset prices, central banks have a proclivity to tighten monetary policy and employ additional countercyclical instruments.

In this case, both interest rate policy and macroprudential policy will mutually strengthen one another to tighten financial sector conditions.

As both will eventually affect the accessibility and cost of borrowing, however, such instruments could also be classified as substitutes. Specifically, interest rate and macroprudential instruments may be adjusted to simultaneously tackle shocks in the macroeconomy and financial sector. For instance, central banks could either raise the interest rate or RR. The interest rate magnitude and RR ratio would be determined depending on the proximity of the macroeconomy with financial stability, and the relative effectiveness of such instruments. For example, a dilemma emerges when inflationary pressures are weak, while credit and asset prices accelerate. One of the possible scenarios of using an instrument mix is the use of interest rate policy to fight inflation, while RR policy is instituted to confront financial system stability risks. Based on such an interpretation, the interest rate may not be changed due to weak inflationary pressures, while the RR could be raised to smother excessive credit growth and a potential asset price hike. The advantage is that an increase in RR may not attract significant capital inflows, unlike an interest rate hike. However, whether the application of this scenario is sufficiently optimal requires further analysis.

Technical Aspects of Implementation

When implementing the policy instrument mix, several aspects require consideration in order for optimal performance, including: (i) the signals necessary to elicit a response; (ii) response characteristics; (iii) timing of implementation and procyclicality; (iv) effectiveness and calibration of policy measures; and (v) policy communication.⁷

⁷ For further discussion on such issues, see Moreno (2011), Committee on the Global Financial System (2010), Borell, et al. (2010) and Born, et al. (2010).

Signals Necessary to Elicit a Response

Within a forward-looking policy perspective, the policy response should be directed towards anticipating signals related to distortions of future macroeconomic balance. In this case, a policy response may not be necessary in the case of temporary shocks. The lessons gleaned from past crises revealed that a number of indicators and analyses can be used as policy response guidance through their advantage to detect resilience, imbalances and systemic risks. Examples of such indicators include financial system resilience, macroeconomic resilience and systemic risk. Generally, such indicators are predominantly set within an early warning system framework.

Therefore, the accuracy of the policy response will depend highly on the performance of those indicators in predicting possible imbalances. Although theoretically such indicators may be easily constructed, the performance of empirical models and analyses in terms of predicting imbalances, or through an early warning system framework, remains unconvincing. For instance, it is difficult to observe the exact timing and magnitude of credit growth that can be sensitive to economic vulnerability, bearing in mind that rapid credit growth is also required within a fast changing economy due to the profit-taking opportunities which lead to financial deepening, as experienced in various Latin American countries. Thereby, there is an urgency to have more systematic research and better understanding of systemic risk characteristics and their correlation to the benefits from a macroeconomic perspective.

Response Characteristics

When formulating a macroprudential policy response, one of the crucial issues is whether the response will apply a *rule vs. discretion*. Similar to monetary policy, the trade-off between a rule versus discretion is a constant. A rule provides certainty for market players and credibility to central banks.

However, a rule that is too rigid undermines the flexibility to respond to both structural changes and uncertainties frequently occurring in the financial market.

On the other hand, discretion provides room for central banks to assess the macroprudential impact against the financial system and the economy and then to apply some adjustments towards the use of such approaches in addition to setting a judgment over the possibility of future policies to be taken. Discretion definitely triggers uncertainties over possible future policies, which would unquestionably compel prudence amongst market players by maintaining liquidity and a capital ratio at a higher level than required. Consequently, banks would become less efficient and charge the cost of capital to borrowers, creating a high cost of credit in the economy. Discretion may also lead to forbearance, especially when confronted with a difficult or unpopular decision to be taken. Nonetheless, such discretion policy bears a legal consequence on the central bank. Considering the strengths and weaknesses of both rules and discretion, the decision model could incorporate rule-constrained discretion.

Timing of Implementation and Procyclicality

It is important to take into account the timing of policy application during an economic cycle, partly because a macroprudential regulation is often procyclical.⁸ A number of other issues pertaining to the application of a macroprudential framework are countercyclical as follows.

⁸ For example, the provision on the removal of allocation for productive assets (the loan-loss provision) tends to decrease while the NPL ratio also tends to fall during the expansionary period. The financial market itself is procyclical as risk distribution tends to narrow during the expansionary phase and dilate, sometimes drastically, during the contractionary phase. From a risk-management perspective, policy instruments should ideally be applied as early as possible by considering the risks that may appear in the event of deteriorating economic conditions (based on observations of economic cycles). Some opinions suggest that measures should be countercyclical, i.e., tightening during periods of expansion and loosening during periods of contraction. In response to the crisis, the Basel Committee on Banking Supervision took a number of measures (in the context of Basel III) to reduce procyclicality. These measures include (i) assessing and mitigating the effect of cyclicity of

1. Relates to how much weight is given to measures to stabilize an economic cycle (e.g. GDP) compared to measures to manage the financial sector cycle (e.g. credit and asset prices). One fundamental issue is whether with the rapid innovation found in the financial sector, the policymaking authorities are able, in a timely fashion, to extract the financial sector cycles (e.g. “excessive” credit growth, “inflated” asset prices, “abundant” liquidity) from the variations in the normal cycle and long-term trends.
2. Relates to who should assess the cycle (the public sector or the private sector)? As is known, economic cycles are unobservable and methods to estimate them are fraught with numerous uncertainties. Therefore, a diversity of opinions is likely to occur. One of the solutions for policymaking authorities is to rely on a group of independent experts like the approach taken in Chile (to determine the long-term trend of the country’s GDP and copper prices) when implementing the fiscal rule.
3. Relates to the timeliness of action taken. Lateness in taking action may have implications on actions that are more procyclical than countercyclical.
4. Relates to whether the prudential ratio should remain constant or move with the cycle. A solution would be to set a wide enough range of stability for, say, the targeted GDP. Thus, the change in provisioning to manage the cycle is adjusted only when the target is outside the corridor. In this regard, judicious decisions are critical to complement the existing formal rule or to calibrate policy measures.

Effectiveness And Calibration Of Policy Measures

The effectiveness a policy instrument will affect the calibration of the selection of policy measures that are deemed appropriate. In contrast to the

minimum capital requirements; (ii) encouraging forward-looking provisioning; (iii) adopting a regulatory framework for capital conservation and countercyclical buffer; and (iv) introducing a minimum leverage ratio.

analysis of monetary policy transmission, there has been no theoretical macroprudential policy framework developed or robust empirical results to guide the calibration. With the uncertain impact of a macroprudential policy instrument, the policymaking authorities need to be pragmatic in the use of the instrument. This is certainly not easy in the absence of a theoretical foundation and empirical research that describes how policy measures might be adjusted when calculating potential risks that could arise.

A study on the results of the calibration of macroprudential policies in OECD countries (Barrell, et al., 2010) indicates that, in general, macroprudential policies can be used to address the macroeconomic risks confronting banks and simultaneously reduce the probability of a crisis happening. Antipa, et al. (2011), using the UK and U.S. as case studies, also concluded that macroprudential policies would have been particularly effective for smoothing the credit cycle and preventing the global financial crisis from bringing about deeper ramifications. Beyond these findings, one particular thing that is important to note is the need for a compromise to enable a country to make adjustments to the application of macroprudential instruments considering that adjustments to instruments or regulations may also lead to the incurrence of costs, including an increase in funding costs and margins, thus adversely impacting an increase in economic activity. Thus, policy application needs to be performed at a proper dosage in order to align the costs and benefits thereof with the risk control expected.

Policy Communication

Communication in the context of monetary policy and macroprudential integration is crucial and by no means a simple challenge. *Firstly*, conveying a message to the market about the dangers of the growing imbalance in the financial sector during an economic boom is difficult because such a message would be very unpopular in the midst of market optimism. A monetary policy response in the form of higher interest rates when there are no immediate inflationary pressures is politically and

economically hard to accept because the central bank could be perceived as jeopardizing growth and the interests of the people. Therefore, persuasive communication to the public concerning the importance of long-term stability is very much required. The communication strategy for normal conditions would be unusable under conditions of excessive optimism. The communication of monetary policy needs to adjust to the ongoing dynamics of the financial system. Here, the role of macroprudential policy that is rule-based in supporting monetary policy makes the central bank's task easier. With such support, monetary policy only plays the role of transmitting signals rather than directly controlling the growing risks in the financial sector. *Secondly*, future economic uncertainties, which are very high, especially during the turning points of economic cycles, pose a unique challenge for policy communication.

Conclusion and Implications

In this paper we have discussed various underlying aspects of the linkage between monetary and financial stability and a number of central issues that still need to be analysed further, particularly in relation to the practical significance of risk-taking behaviour in reshaping the workings of the monetary policy transmission mechanism. The discussion leads us to the understanding that there are several strategic and tactical challenges facing central banks in terms of designing policy strategy to integrate the monetary and macroprudential policy framework, especially to meet the dual objectives of monetary stability (price) and financial stability. Given the fact that the nexus between monetary and financial stability, whether they are substitutes or complements, is still an open debate, it is important to draw implications, especially related to the central bank's policy mandate.

Adjustment of Mandate and Its Consequences on Policy Governance

Learning from the crisis, when formulating a post-crisis monetary policy strategy the central bank should increasingly strengthen its function in

terms of stabilizing the financial system to ensure macroeconomic stability. The shifting or emphasizing of the central bank's mandate to maintain financial system stability has consequences on policy governance. Moving away from the generally understood format of monetary policy governance, as in the application of ITF, the format of policy governance for financial system stability is not yet fully understood. Adoption of financial system stability as a major or additional aspect of the responsibilities of the central bank could give rise to complications in the format of central bank policy governance. Hence, it is by no means an easy feat to design a central bank's mandate to simultaneously maintain the stability of prices and the financial system.

There are several underlying reasons for complications in central bank policy governance (Crockett, 2010). *Firstly*, there is no firm and quantified understanding of the objectives of financial stability as understood in the objectives of price stability. Thus, there has been no benchmark on how to assess the central bank's success in fulfilling its responsibility to maintain financial stability. *Secondly*, the responsibility for maintaining financial system stability is essentially multidimensional. The scope of such responsibility starts from prudential supervision, the establishment of policies to prevent systemic risks to liquidity support in the financial market and individual financial institutions. In this regard, there is no clear governance model that accommodates differences in the characteristics of each of these steps. *Thirdly*, decisions related to financial system stability tend to be politically sensitive, as compared to monetary stability. This makes it difficult to align the interest to maintain independence with the response to the existing political environment. In that case, the toughest challenge faced by central bank in an effort to maintain independence is how action taken by the central bank, especially in areas outside the central bank's mandate, could finally be officially accepted and legitimized by the government or parliament.

In relation to this way of thinking, one of the issues raised is how to place a mandate to maintain financial system stability in the monetary policy framework. One of the alternative monetary policy formats that can be drawn up is to continue using price stability as the main element that determines the monetary policy response. The substance of price stability has expanded, however, to accommodate financial stability indicators and has a broader forward-looking horizon.

Another alternative policy format is to establish strengthening financial system stability as one of the mandates of monetary policy, in addition to maintaining price stability. In respect to this, Svensson (2010) asserts that there is a close linkage between the achievement of monetary stability and financial system stability. Financial system stability directly affects the financial market and financial market conditions will affect the effectiveness of the monetary policy transmission mechanism. Therefore, a financial market in trouble may affect real economic activities drastically, as indicated by the occurrence of financial crises. Meanwhile, monetary policy affects bank balance sheets and asset prices, which in turn affect financial system stability. Despite being interrelated, however, both have conceptual differences in terms of the objectives, instruments used and authorities responsible. Thus, it is unreasonable to refer to the achievement of financial stability as part of the monetary policy mandate.⁹

Hence, some views suggest that price stability should be the overarching objective of monetary policy¹⁰. Meanwhile, the substance of financial system stability, particularly in its relation to macroprudential policies, should be calculated carefully and efforts should be made to prevent the achievement of policy goals that are too ambitious, for example through

⁹ Beyond that, as argued by Blinder (2010) and Nyberg (2010), such conceptual differences do not negate the possible gains of accountability, which are vast, for maintaining financial system stability by the central bank.

¹⁰ See Svensson (2010), Hannoun (2010), and Jordan (2010)

overregulating the development of asset prices and credit growth. One initial step to address this situation is through the use of macroprudential instruments to address the apparent imbalance in credit and asset markets. In the future, in line with the policy practice of using various macroprudential instruments along with monetary instruments, a more appropriate policy mandate could be formulated on the basis of past experiences.

Mandate for the Implementation of Macroprudential and Microprudential Policies

In carrying out its function to achieve and maintain financial system stability, a central bank requires supporting instruments in the form of macroprudential and microprudential supervision. Macroprudential supervision refers to the process of managing the overall soundness of the financial system, which is achieved through a series of behavioural analyses of the financial sector and financial market conditions. This management process is implemented by designing policy architecture and responses to ongoing financial system conditions. Meanwhile, microprudential supervision is the process of individually managing the soundness of financial institutions, which is carried out through supervision and regulation that is expected, in aggregate, to create continuity and stability in the financial system and provide consumer protection.

The crisis also showed that close coordination between microprudential supervision and macroprudential supervision in formulating appropriate and expeditious policies at crucial times is required. Macroprudential supervision is directed at the activities of financial institutions, both banks and nonbanks, which have a significant influence on both the financial market and the financial system. According to macroprudential supervision, macro indicators are monitored as a means to anticipate and mitigate various anticipated risks that may threaten the stability of the financial system and real economy as a whole. In addition, monitoring macroprudential conditions may also provide information on

systemic risks and mitigate the propagating effects of disturbances occurring at financial institutions that may interfere with the business cycle. Information acquired from macroprudential supervision will assist policymakers as to whether it is necessary or not to rescue a financial institution that is experiencing a lack of liquidity. In practice, the authority carrying out the monitoring of macroprudential conditions requires immediate and forthcoming access to information, micro data and unimpeded official authority to acquire any additional data as required.

Given the linkages between microprudential policy and macroprudential policy, does this also mean that the central bank also needs to be given the responsibility to implement microprudential policies? Those arguing for or against the need for central banks to implement microprudential policies are still continuing their debates to this day. Substantively, it can be understood that the most important element for the effectiveness of central banks in maintaining financial system stability is the continuity of the flow of exchange and the quality of information between microprudential and macroprudential supervisory agencies, given that the functions of both agencies are complementary. In light of this, the feasibility of information exchanged depends on the institutional framework of the agencies, their habits and human factors.

Thus, if the central bank is not mandated to implement microprudential policies, then close coordination between the central bank and the competent authorities in the microprudential supervision sector is absolutely necessary. In other words, coordination is as necessary as maintaining consistency and harmony amongst the achievement of the goals of monetary, macroprudential and microprudential policies. In this case, macroprudential policy has an extremely vital role both in supporting monetary policy in maintaining macroeconomic stability and microprudential policy. Macroprudential policy in a narrower dimension requires the consistent use of microprudential instruments while

macroprudential policy in a broader sense requires consistent monetary policy.

The aforementioned view has very significant ramifications on the institutional mandate of Bank Indonesia, whereby the banking supervision function was separated from Bank Indonesia and turned over to a new institution, namely the Financial Services Authority (FSA). The paradigm that monetary policy requires the support of macroprudential policy implies that the two cannot be separated in order for both to operate effectively.

After the establishment of FSA, the macroprudential policy framework shall inevitably involve two institutions, that is, Bank Indonesia and the FSA, which is authorized to regulate and supervise microfinance institutions. Bank Indonesia has the ability to assess macroeconomic risks and global financial market developments. Meanwhile, the FSA has information about individual financial institutions. Therefore, in order for the system to function properly, there must be a mutual exchange of information between Bank Indonesia and the FSA.¹¹ The FSA must provide all information relating to the monitoring of individual risks whereas Bank Indonesia has access to macroprudential assessments that must be submitted to the FSA to be implemented at an individual level.

¹¹ Arguments for and against the need for central banks to implement microprudential policies are still continuing to develop to this day. Substantively, it can be understood that the most important element for the effectiveness of central banks in maintaining financial system stability is the continuity of the flow of exchange and the quality of information between microprudential and macroprudential supervision, given that the two have complementary functions. Pertaining to this, feasible information depends on institutional form, habits and the human factor. Thus, if a central bank is not mandated to implement microprudential policies, close coordination between the central bank and the competent authorities in the microprudential supervision sector is absolutely necessary.

COUNTRY EXPERIENCE AND EMPIRICAL STUDY

9. Bank Indonesia Policy Mix

Juda Agung, Yati Kurniati, Reza Anglingkusumo and Sahminan

Introduction

This chapter is designed to give a prelude to tomorrow's policy simulation exercise. This relates to our experience after the global financial crisis between 2008 and 2015. The data that we will be using in this presentation is up to 2015. The presentation will be divided into four main areas. We will begin by providing the policy context before discussing the policy challenges and policy discussions in the aftermath of the global financial crisis that we at bank Indonesia undertook, given the policy challenges at that time. We will then discuss the policy responses and close by offering some conclusions.

As will be discussed, against the backdrop of a dynamic global environment, the multitude of challenges confronting the Indonesian economy demanded a policy mix response utilizing multiple instruments. Consequently, we allowed our inflation targeting framework to become more flexible than standard ITF in terms of managing monetary and financial stability in Indonesia. Under Bank Indonesia's policy mix response, the integration of monetary and macroprudential policy provides better results in terms of mitigating excessive macroeconomic and financial sector fluctuations compared to any single policy instrument. A lot of the material in this presentation has been borrowed heavily from the main references listed here¹².

Policy Context

Global

¹² See Agung, et al. (2016), Warjiyo and Juhro (2016), and Juhro (2014, 2015)

In 2008, the sub-prime mortgage default sent shockwaves of heightened counterparty risk in the global financial markets. Starting in the US financial markets, the counterparty risk increased, which drained liquidity, especially in the money markets. The resulting impact was that firms had limited access to credit and as a result, economic growth and economic transactions slowed down significantly, not only in the US but also in the European Union and other advanced economies, with spillover to emerging market economies, including Indonesia. There was a synchronized slowdown/recession in the global economy. In the aftermath of the global financial crisis, we observed boom-bust cycles in the global economy. Many explanations have been put forward why such boom-bust cycles could take place. One plausible explanation is that the structural policy measures, which are very important to address the underlying fundamental problems related to crises, were lagging behind the cyclical measures and, hence, the boom-bust cycles of economic activity appeared along the long-run trajectory. Relating to the boom-bust economic cycles were the global commodity price cycles. I have put global commodity price cycles here because this relates very strongly with the Indonesian case because we are a commodity producing exporter. Some of you may remember, this was called the commodity super cycle. The cycle started early in the year 2000, in the aftermath of China's admission to the World Trade Organization. The Chinese economy subsequently expanded and with the expansion, demand for commodities increased, triggering a commodity super cycle. Fuelling this commodity super cycle as well was the Great Moderation in advanced economies as well as the US, where inflation was quite low, which prompted the Federal Reserve to loosen its monetary policy for a prolonged period of time. That also fuelled the commodity price boom. This ended during the global financial crisis.

Figure 9.1. World Economic Growth

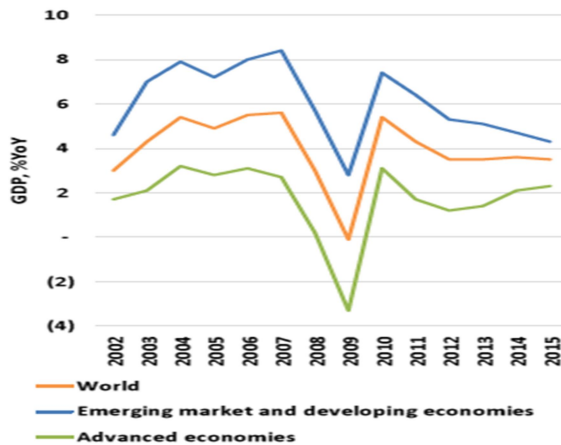
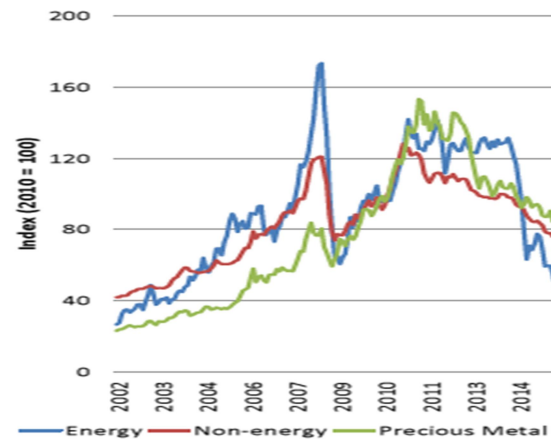


Figure 9.2. Global Commodity Prices Index



Source: IMF-WEO Database and World Bank

Conditions recovered but given the sluggishness in the global economic recovery, and a permanent slowdown in the Chinese economy, we saw that commodity prices slowly went down afterwards. This is important because our current account, which also records our trade balance, depends heavily on the commodity cycle. In response to this fear of a growth slowdown and the threat of deflation as well as to avoid a repeat of the Great Depression, the Federal Reserve, the US monetary authority, embarked on an unprecedented policy, namely quantitative easing (QE). More recently, this has become quantitative tightening but in the aftermath of the global financial crisis in 2009-2010, the Federal Reserve implemented quantitative easing. This amounted to the printing of US dollars. The Fed was printing money by purchasing assets, not only from financial corporations but also non-financial corporations. That created excess liquidity, as intended, which lowered yields and the Fed Funds Rate but increased the asset side of the Federal Reserve's balance sheet. When the asset side of the Federal Reserve's balance sheet increases, it means the bank is printing money. The Fed added extra US dollar liquidity into the US economy. The idea was that the excess liquidity would, in turn, reflate the US economy and avoid a prolonged recession along with the threat of deflation. Nevertheless, the quantitative easing had a

spillover effect on the global economy in the form of large and volatile capital flows. The money permeated into many corners of the global financial markets, including emerging market economies and Indonesia. That is the global context of where we found ourselves in the aftermath of the global financial crisis from 2008-2010.

Figure 9.3. US Monetary Policy and Global Risk

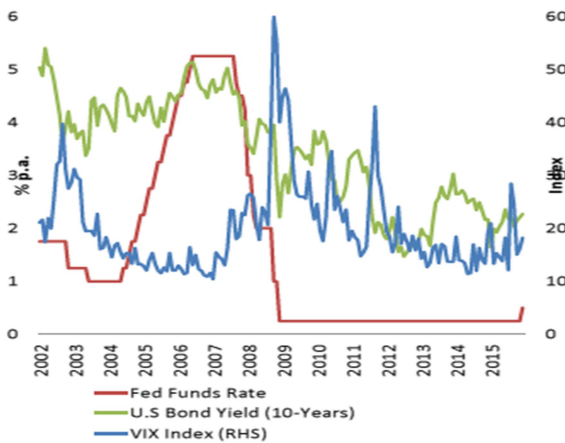
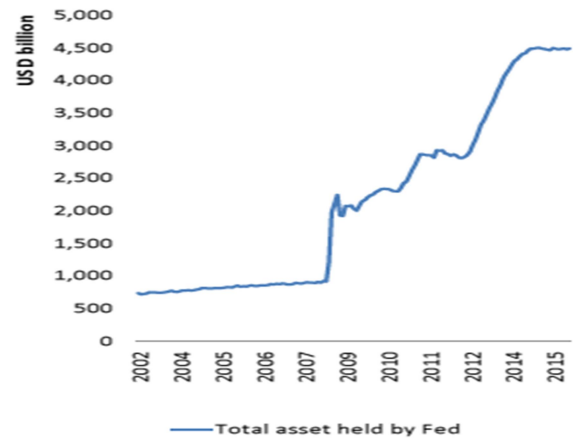


Figure 9.4. Unconventional Monetary Policy

(Balance sheet of Fed)



Source: US Federal Reserve; FRED Database

Domestic

With the dynamics of the global financial markets and global economy together with the heightened uncertainty that went with it, as a small and very open economy with strong integration in the global financial market, how did Indonesia fair? What were the key risk factors the policy authorities had to cope with in the aftermath of the global financial crisis? Those were the questions in the back of our minds as policymakers in Indonesia at that time. Actually, we found that inflation in Indonesia, at that time, was quite manageable. The disinflation path continued. An excepting a few episodes where administered prices went up, inflation in Indonesia remained around the target corridor. The higher administered prices typically related to government fiscal reform in the area of subsidies. For example, the

government lifted the product-based subsidies on energy and used the money for people-based subsidies, such as education. This was part of the fiscal consolidation policy of the government and fiscal reform. The shaded area on the graph represents the target range of headline inflation set jointly by the government and central bank. Looking at the components of CPI inflation, core inflation (blue line) remained within the target range, even during periods of rising administered prices. The fact that core inflation was maintained within the target corridor set by the government and Bank Indonesia suggests that monetary policy was able to limit the second-round effect of price shocks to inflation. This demonstrates the credibility gains of monetary policy in terms of information management. Bank Indonesia was happy with this outcome. It suggested that monetary policy had gained credibility. The question then becomes how to secure the credibility gains given the risk factors affecting the Indonesian economy in the aftermath of the global financial crisis? Most of the risks related to increasing macro vulnerability in the aftermath of the global financial crisis. In 2009-2010, Indonesia's balance of payments enjoyed a current account surplus most of the time before starting to decline into a deficit in 2011-2012. This relates to the commodity price bust because a significant portion of our exports are commodity based, such as crude palm oil (CPO), coal, nickel and so on. That was the first macro vulnerability we observed. In 2012-2013, the current account deficit widened and started to constrain economic growth in Indonesia, thereby increasing economic vulnerability in the country. GDP growth remained solid at around 5%, however, which sustained the confidence of investors in the global financial markets. Therefore, investors kept buying Indonesian securities, which financed our current account deficit through the capital and financial account. At that time, the capital and financial account recorded large surpluses. The balance thus reflected an external posture. We saw increasing vulnerability in terms of our current account, but we were able to finance the current account through the capital

and financial account, especially portfolio flows, thanks to quantitative easing. A lot of the money flowed from the US through the global financial markets, such as wholesale funding and local currency bonds in emerging markets, due to the spillover impact of quantitative easing. Consequently, we were able to finance our current account deficit.

Figure 9.5. Indonesia Inflation: Headline CPI

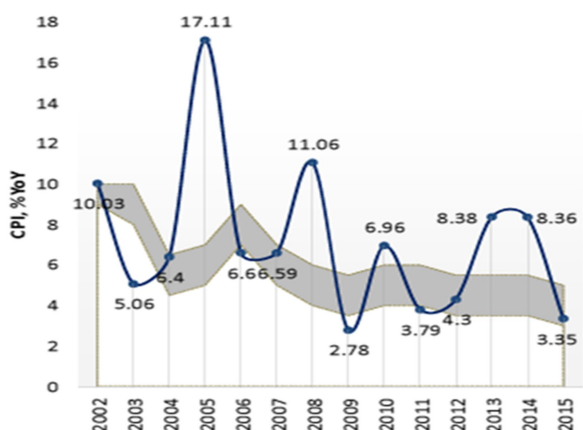


Figure 9.6. Indonesia Inflation by Component CPI

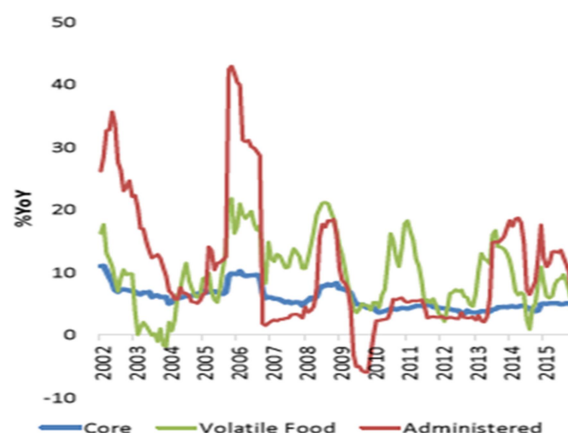


Figure 9.7. Indonesia Balance of Payment

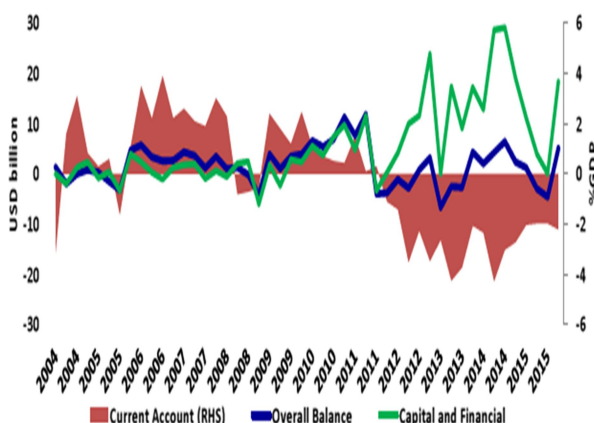
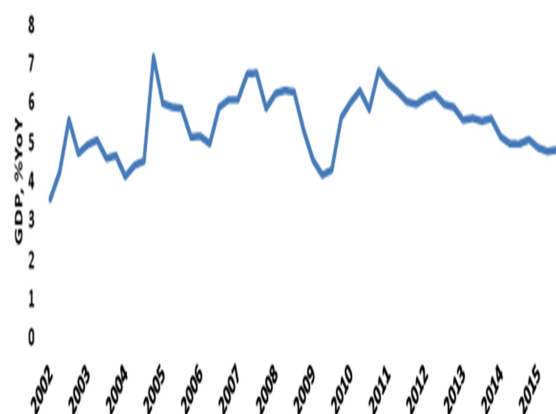


Figure 9.8. Indonesia GDP Growth



Source: BPS

Notwithstanding, such conditions brought other risks because capital flows are prone to volatility and shifts in investor sentiment or expectations about the stance of global monetary policy and the relative parity of interest

rates between the home country and the host country, for instance. This chart shows the composition of instruments in the capital and financial account flows. The flows were dominated by the bond market and equity market, mostly investors buying Indonesian local currency government bonds. The chart shows that shifts in investor confidence, for example during the euro crisis in 2011, precipitated a drop in the capital and financial account, meaning that capital flowed out of Indonesia. The flows would subsequently resume before another shock, this time the Taper Tantrum, would trigger more capital outflows. The Taper Tantrum was prompted by a statement issued by Ben Bernanke concerning the Fed's upcoming plan to normalize monetary policy. This spurred a portfolio adjustment by global investors, which affected our financial markets as capital flowed out of the country. This happened again in 2015 when the Fed actually began normalizing its monetary policy and reducing its balance sheet.

Figure 9.9. Indonesia: Capital and Financial Flow

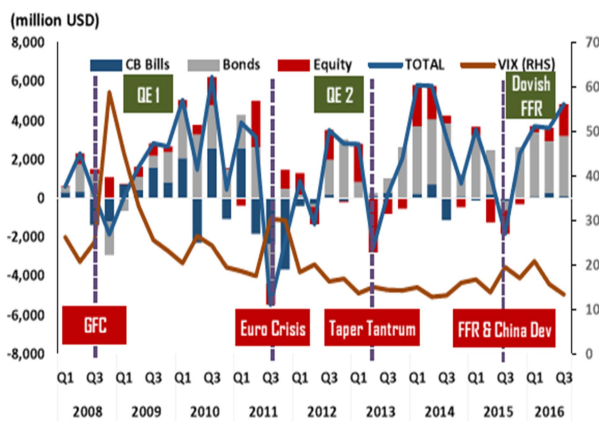
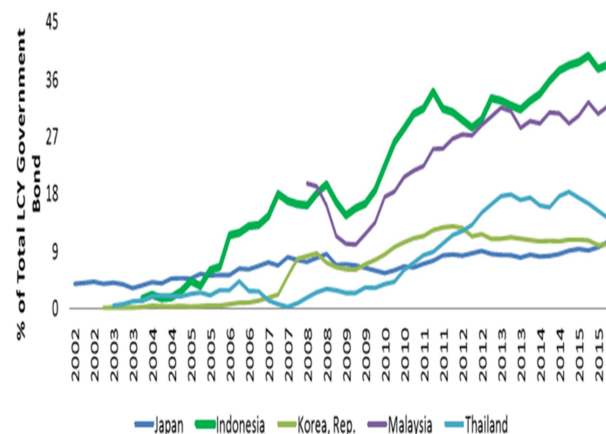


Figure 9.10. Foreign Holding of Local Currency Government Bond

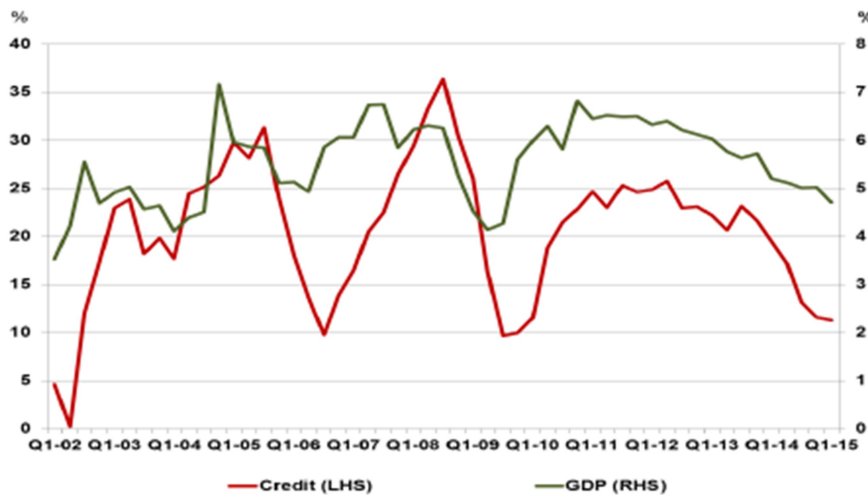


Source: BI; ADB

As of 2015, around 40% of Indonesia's local currency government bonds were held by global investors and, hence, prone to shifts in market expectations. It helped us finance our current account deficit but there were risks associated with it. There is always a trade-off in terms of policy; a policy

dilemma that is encountered. Another policy issue/dilemma was to avoid boom-bust cycles, where the real sector and financial sector tend to move in a pro-cyclical way. When an economy is booming, credit is also booming. When the business cycle begins to decline, the financial cycle is still increasing and that is something to be avoided because rapid credit growth (boom) will eventually bust because, as with the experience of advanced economies before the global financial crisis, a rapid credit boom masks the concentration of risk, making it unobservable. This can catch policymakers off-guard. There is uncertainty with regards to where the concentration of risk is.

Figure 9.11. Indonesia: Domestic Credit



Source: BI

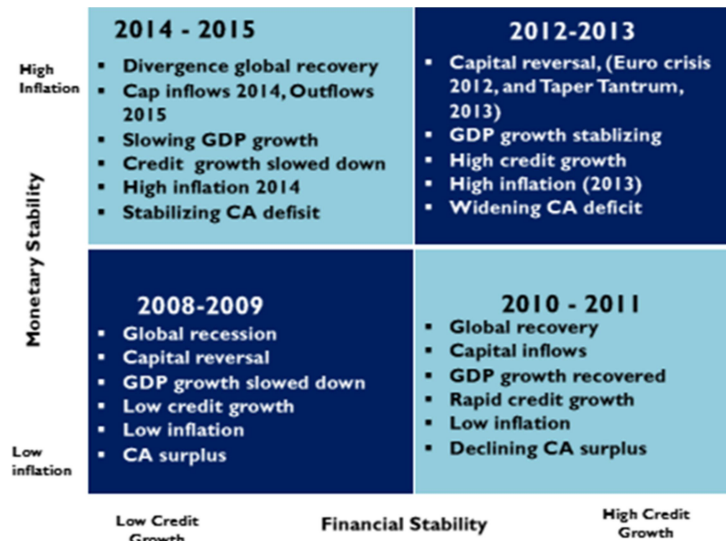
Policy Challenges and Discussion

Policy Challenges

That was the global and domestic policy context but what are the policy challenges? I have distilled all the dynamics of the domestic and global economies into this one matrix. There are four episodes, namely 2008-2009, 2010-2011, 2012-2013 and 2014-2015. Monetary stability is on the y-axis and financial stability on the x-axis. With monetary stability, you have high

inflation, implying a period of growing risk to price stability, and low inflation where the risks to price stability are actually subdued. In terms of financial stability, there is high credit growth that usually increases the concentration of risk due to lower lending standards, and also low credit growth. That produces this matrix, which is important because later on we will see what kind of policies should be used in each of these episodes.

Figure 9.12. Policy Challenges in Four Different Time



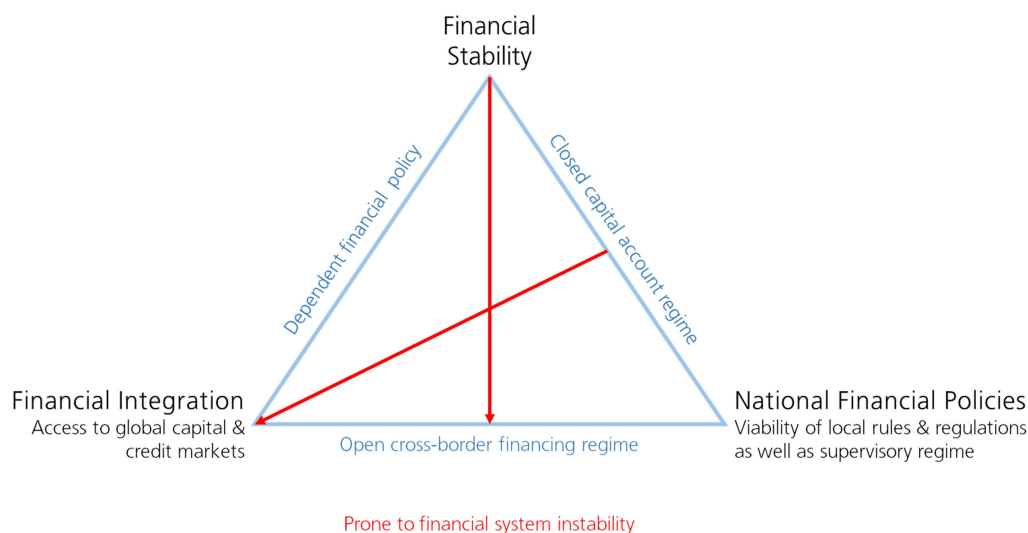
This chart presents another way of looking at the policy challenges, which was our way of thinking at that time. We are an inflation targeting country, and our target is inflation, but we have dual objectives. However, there would be no price stability without financial system stability. To maintain macroeconomic stability, financial system stability is also required. Macroeconomic stability is our mandate, but we also have to consider financial stability as well because the real sector and the financial sector tend to behave in tandem in a pro-cyclical way. Pro-cyclicality usually embodies risk-taking behavior. This is usually a source of risk concentration and functions as a financial accelerator. Risk-taking behavior is also influenced by the dynamics of the global environment, particularly the world interest rate or global capital flows. When interest rates in advanced economies are low,

namely an accommodative monetary policy stance, it means they are printing money. Risk-taking behavior will consequently affect us in the domestic economy because Indonesia is a small open economy and well-integrated into the global capital markets because we issue bonds that can be purchased by foreigners, which we need in order to finance our current account deficit. Basically, we need to finance our development.

In 2011, when we published the Indonesia Economic Report for 2010, the terms ‘policy trilemma’ and ‘policy mix’ were used in our press release because they featured very much in our thinking in 2010. We have the classic Mundell Trilemma, which says that as a country, you want access to the global capital and credit markets but if you want access, you have to allow the exchange rate to float, namely you cannot control your exchange rate, and you have to somehow let your monetary policy adjust to shifts in global sentiment. This means that the reaction function of monetary policy must be allowed to be a function of other central banks’ reaction function. This means that if the Federal Reserve is thinking of raising its interest rate, other central banks may have to follow suit in response. Parity must be maintained along with the competitiveness of your financial instruments. Nevertheless, that would make us prone to exchange rate and financial market volatility. There is another trilemma, known as the Financial Trilemma, and the concept was first introduced in 2011 by Dirk Schoenmaker (Schoenmaker, 2011). It has also appeared in the International Journal of Central Banking. According to the Financial Trilemma, if a central bank desires financial integration (access to global capital and credit markets), it must follow the rules or regulatory regimes that have international standards. The authorities must be disciplined not to follow discretionary local rules. For example, Basel III implementation safeguards the financial system from potential risks to financial stability, but some policy autonomy is lost in terms of setting your own national policy. There is another trilemma, known as the Governance Trilemma. If you want your rule to be universal and democratic, you cannot

have effective rules. A good example of this is the United Nations, a democratic institution with universal coverage but somewhat ineffective.

Figure 9.13. Financial Trilemma



Source: Schoenmaker (2011)

Policy Discussion: Managing Capital Flows

Another theme in our discussion was how to manage capital flows. In 2011-2012, the main message coming out of the IMF and World Bank was about capital flows. It is a question of how to handle capital surges and capital inflows. During 2011-2013, a lot of capital was flowing to emerging markets. We were the recipients of large capital inflows. This triggered macroeconomic concerns. First, the national economy may overheat due to excess liquidity. Second, we might lose competitiveness because our exchange rate is appreciating. Most central banks manage this by accumulating foreign reserves but this incurs a sterilization cost.

Those are the macroeconomic concerns but there are also financial stability risks because a credit boom usually carries with it concentration risk and the potential for asset price bubbles. Hence, to manage capital surges, the idea was first to implement consistent macroeconomic policies and prudential policies. This should be the central bank's primary response. Then,

you mitigate the risk through capital flow management, which is a sort of capital control. There is a question about whether you are willing to implement capital controls and how stringent they should be. That forms part of the discussion too and, ultimately, we decided against it because we did not know what the investor reaction would be. That would represent a significant change in regime. Instead, what we decided was to implement the primary response, namely macro policies and prudential policies, because during periods of capital inflow, higher interest rates would actually increase the inflows even more. Macroprudential policies helped us because it placed less burden on our primary instrument, the policy rate.

Monetary Policy versus Macroprudential Policy

Macroprudential policy can be used to support monetary policy in order to curb credit in certain sectors without raising the interest rate. Macroprudential policy addresses risks to the financial system caused by a weakening of financial conditions, financial and sectoral imbalances as well as imprudent behavior and so on. On the other hand, monetary policy addresses the risks associated with economic growth, inflation, current account deficits and exchange rates. Both sets of risks are interrelated (interconnected) but require different policies to address the risks. Furthermore, monetary and macroprudential policies may conflict from time to time, implying a trade-off. For example, during asset price bubbles, credit must be squeezed through higher interest rates. If such a situation is accompanied by low inflation, however, it could contract the economy even more and inflation would be too low, even below the target, but higher interest rates would attract more capital flows. These are the trade-offs that must be considered, such as tighter monetary policy through higher reserve requirements to reduce exchange rate pressures could create liquidity problems for banks or macroprudential policy which requires high capital to maintain the stability of the financial system could hamper economic growth

(aggregate demand) or a loose monetary policy that encourages growth may lead to excessive credit expansion and financial instability.

Policy Discussion

In a nutshell, increasing global financial market integration and large capital flows prompted the monetary authority to shift away from corner solutions towards a middle solution with regards to the trilemma, making the impossible trinity possible. That was the joke at the time, how to make the impossible trilemma possible? Hence, the need emerged for a more flexible and refined inflation targeting framework (ITF). Pure ITF only cares about inflation but that would have been too simplistic for us as a small open economy.

Policy Response

Our policy response was to integrate monetary and macroprudential policy, with a view that there is no macroeconomic stability without financial system stability. That was our main justification. Economic dynamics during financial crises have shown that monetary policy needs to be further directed to anticipate macroeconomic instability risk stemming from the financial system. The central bank needs to strengthen the framework of monetary and financial system stability, which requires monetary and macroprudential policy integration. The goal of macroprudential policy is to guarantee financial system resilience as a whole in a bid to support financial intermediation.

Bank Indonesia Policy Mix

In 2008-2009, Bank Indonesia maintained accommodative monetary and macroprudential policy. In fact, macroprudential policies were around before the term 'macroprudential policy' was invented. Some of the prudential regulations were macroprudential in nature. In 2008-2009, some of the elements of macroprudential policy were already there. The overall stance

of monetary and macroprudential policy was loosening/accommodative. During the period of capital inflows from 2010-2011, we could not raise the interest rate even though, at that time, we saw rising credit growth, which could feed into inflation down the road. Therefore, we implemented macroprudential policy. Simultaneously, we loosened monetary policy and tightened macroprudential policy. In 2012-2013, we experienced inflation shocks. There was a shortage of basic food necessities at that time along with productivity shocks. Consequently, inflation began to rise. As the monetary authority, we could not let that hike in inflation feed through into the inflation expectations and cause second-round effects on the overall price level. In response, we tightened our monetary policy stance, while the macroprudential policy stance remained tight. In 2014-2015, when we saw that credit growth had already begun to decline and we were happy there was no boom or sudden bust in the credit growth, namely there was a smooth transition from rapid credit growth to slower credit growth, we relaxed our macroprudential policy stance.

Optimal Policy Response

In 2010-2011, rapid capital inflows led to excess liquidity and the commodity super-cycle prompted a capital account surplus. Therefore, we implemented a mixed policy response by letting exchange rates appreciate, accumulating reserve assets, increasing the reserve requirement to mitigate the impact of US dollars flowing into the domestic economy, including the foreign exchange reserve requirement, implementing a 6-month holding period for investors buying central bank bills and a net open position to limit banks from having wholesale funding from the markets to only 30% of capital. Foreign exchange exposure up to 30% of capital was permitted. Now we are experiencing capital outflows, we have relaxed the holding period but at that time we required investors to hold their position for at least six months.

In 2012-2013, we allowed our exchange rate to be more flexible as capital outflows prompted rupiah depreciation. We also conducted dual intervention. To ensure the financial system was not deprived of liquidity, however, we purchased government bonds in the secondary market. We also tightened the LTV rules because there were concerns about banks allocating too much credit to the property sector and also to households to purchase property and motorcycles. In Indonesia, motorcycles are everywhere, which is partly a legacy of this era of easy access to finance. Some of these loans to purchase motorcycles were sub-prime. We also introduced a loan-to-deposit ratio linked to the reserve requirements. We had a range for our LDR of 80-92% at that time. Below 80%, we would punish the banks for not lending to people and so the excess would be put towards the reserve requirement. Above 92%, we would punish the banks for being a risk taker. This was an LDR-linked RR, which can be tightened or loosened as required.

In 2014, we introduced another regulation relating to rising private external debt. A lot of Indonesian non-bank corporations were financing their activities through private debt. We did not like this trend due to the risks that would emerge from global shocks, leading to volatility in the financial markets. Therefore, we required non-financial corporations to hedge their foreign exchange exposures. In general, our policy response was a mixture of allowing the exchange rate to be more flexible at times through dual intervention and accumulating reserve assets, and the Bank Indonesia policy rate. We tried to balance the three indicators of international reserves, exchange rates and BI rate.

Structural Reform: Promoting FDI

The issue is foreign capital. Portfolio flows carry a lot of volatility but there is a part of the inflows that we would love to have, namely FDI or foreign direct investment. In addition to the policy mix, the government implemented many structural reforms that allowed Indonesia to be a

desirable place for investment (FDI). Consequently, a lot of FDI regulations have been relaxed, including foreign ownership regulations. Before, we requested FDI firms coming to Indonesia to have a 50% share with local partners. Therefore, if it was a USD10 billion investment for example, where would we find a local investor able to invest USD5 billion? Not too many Indonesian people have USD5 billion to throw around. Consequently, we relaxed the regulations. From the fiscal policy side, the need to finance our economy through foreign savings meant it was important to maintain long-term fiscal sustainability. From 2012 onwards, therefore, the path of our fiscal policy has been one of consolidation. We are trying to reach a surplus in our primary balance. Perhaps later, one of our colleagues from the Ministry of Finance could explain fiscal consolidation in Indonesia.

Conclusion

Against the backdrop of a dynamic global environment, the multitude of challenges confronting the Indonesian economy demanded a policy mix response utilizing multiple instruments. Consequently, we allowed our inflation targeting framework to become more flexible than standard ITF in terms of managing monetary and financial stability in Indonesia. Under BI's policy mix response, the integration of monetary and macroprudential policy provides better results in terms of mitigating excessive macroeconomic and financial sector fluctuations compared to any single policy instrument.

Interaction	
<i>Speaker:</i>	Please elaborate on foreign ownership of banks.
<i>Participant:</i>	Regarding foreign ownership of banks, we regulate everyone equally, foreign and domestic. An individual can buy a bank up to 20% of bank equity or 30-40% for a financial institution. This applies to foreign and domestic investors.

<i>Speaker:</i>	All of the data and your experiences in the presentation are up to 2015, especially in terms of how the central bank formulated its policy response from the challenges that were encountered. From 2016-2018, however, 16 economic policy packages were introduced by the government, some of which would have influenced the central bank policy mix. How can we manage these 16 economic policy packages to ensure that our macroprudential policy, in the years ahead, remains effective?
<i>Participant:</i>	This question concerns structural reforms conducted by the government. There have already been 16 economic packages since 2016 that were directed towards many things, including social protection, promoting foreign investment and so on. Some of those policies have been quite effective in terms of social protection. Furthermore, some of the FDI measures have also been effective but more recently, when our current account deficit tended to persist, the government started to strengthen the FDI policies with many more relaxations, including tax holidays and R&D incentives, for example, to allow FDI to enter Indonesia. These are not short-term solutions. We will only see the benefits of these reforms later in the long run. We have just planted the seeds, but it will take time for the trees to produce fruit. The reforms conducted by the government contained massive infrastructure projects, which required imports. Nevertheless, we were able to control a manageable current account deficit through import control policy. In 2018, the current account deficit was even narrower, showing how effective the policies had been.

10. Central Bank of the Republic of Turkey Policy Mix

Tayyar Buyukbasaran, Mustafa Faruk Aydin, Devrim Yavuz, Eda Gulsen

Introduction

This chapter will focus on the policy experience of the Central Bank of the Republic of Turkey (CBRT) concerning the policy mix. I work as an economist at the central bank in the Research and Monetary Policy Department. My first lecture is about the central bank policy mix experience in Turkey and then I would like to share some research we have done at the central bank on the policy mix.

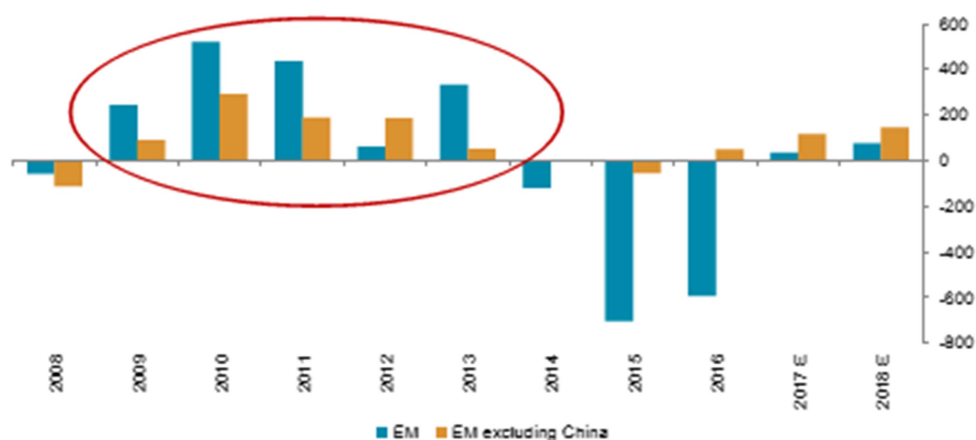
The first session will be in three parts. In the first part, I will explain the impact of the global financial crisis on the international financial markets, including the lessons learned, the challenges faced and the need for a policy mix. In the second part, I will explain Turkey's experience concerning the policy mix, how the authorities in Turkey handled the trade-offs, the measures taken and the results. In the last part, I will talk briefly about the recent developments in Turkey, how the policies have affected the reversal of the global financial cycle and gradual normalization of monetary policy.

Some Lessons Learned Since the GFC

After the 2007-2009 global financial crisis, the advanced economies implemented unorthodox monetary policy, which triggered vast global liquidity and capital flows to emerging markets. After the global financial crisis, the unorthodox policies of the advanced economies triggered huge volatility and capital flows to emerging markets. This graph is from the Institute of International Finance (IIF) and shows the portfolio flows to emerging markets. The blue column represents all emerging markets and the orange column represents all emerging markets excluding China. After 2008, we see a huge amount of capital inflows with high volatility. If you want to

look at this graph in more detail, we see these volatile capital inflows in bonds and equities. This graph is from the EPFR and it shows that bond and equity flows nearly quadrupled after the QE policies of the advanced economies.

Figure 10.1. Portfolio Flows to Ems
(Net, Billion USD)



Source: IIF

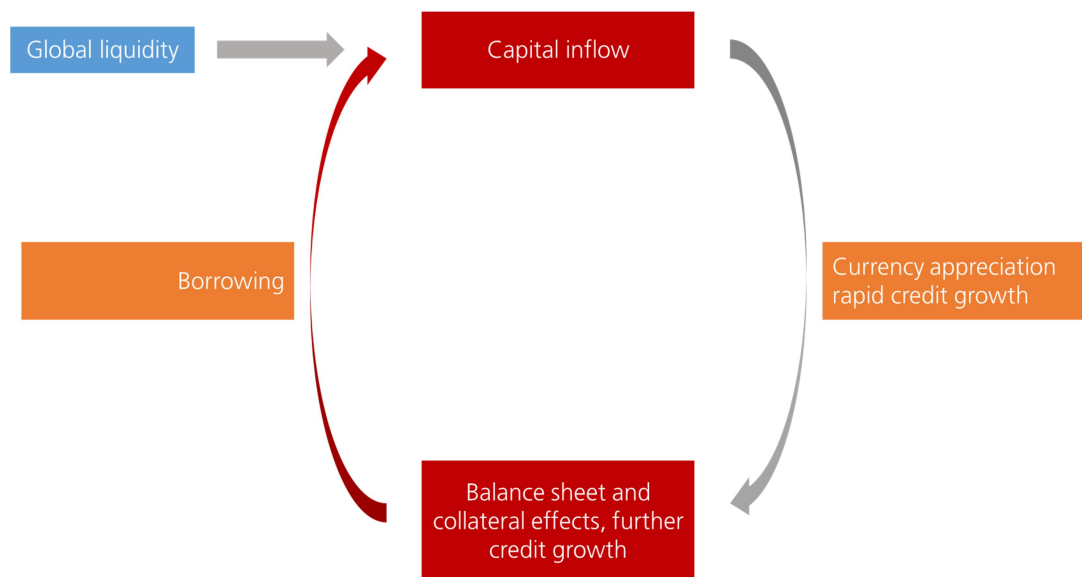
Post-Crisis Dynamics and Spillovers to the Ems

In advanced economies, there were historically low policy rates and quantitative easing policies, which had important implications for emerging markets, such as a surge in capital inflows to emerging markets, rapid credit expansion and real exchange rate appreciation. Consequently, with rapid credit expansion and real exchange rate appreciation, we saw a deteriorating current account balance in the emerging markets. Current account deficits increased vulnerability to sudden stops in global risk appetite and capital flow reversals. Such global financial conditions also amplified macro-financial linkages in the economy.

A Self-Feeding Cycle Amplifies the Effects of Capital Inflows

This figure explains the macro-financial linkages through global liquidity conditions. When global liquidity conditions become easier, it reflects itself as capital inflows to emerging markets. When the capital inflows come to the emerging countries, we see real currency appreciation and rapid credit growth. Currency appreciation has balance sheet and collateral effects because firms that have foreign currency liabilities on their balance sheet will be in a better position due to currency appreciation. Therefore, the collateral constraints will be relaxed due to real currency appreciation and the firms will demand more credit because they are in a better position. This will lead to further credit growth. To meet the firms' credit demand, banks need to take some external borrowing, which also increases capital inflows. This is a self-feeding cycle and the capital flows amplify the effects of the cycle.

Figure 10.2. Macro-financial Linkages: Global Liquidity



Challenge 1: Financial Channel. There is a challenge under these conditions for the policymakers because the exchange rate should act as a shock absorber under free capital mobility and a flexible exchange rate regime. What I mean by shock absorber is that when capital flows increase, this leads to real currency appreciation and this should be reflected in net exports. When the currency appreciates, we see a decrease in net exports but

the self-feeding cycle creates some challenges for the economy because it has a financial channel as well. When capital inflows increase and the real exchange rate appreciates, it has a balance sheet effect through the risk-taking channel, which leads to an increase in credit growth. This is the opposite of the trade channel. Through the financial channel, the firms want to have fewer credit constraints and through the risk-taking channel, what I mean is that, since the currency is appreciating, banks think that foreign funding is not as risky as previously because global liquidity conditions are easier. Therefore, the banks take more risk when deciding on the loan portfolio, namely to which firms they want to extend loans. Consequently, banks take more risk. These two channels work in opposite directions, which is a challenge for monetary policy because we do not know how output will be affected through these capital inflows.

Challenge 2: Exchange Rate Pass-Through. The second challenge concerns exchange rate pass-through. As you would expect, capital inflows are primarily associated with economic booms. Under strong aggregate demand conditions, exchange rate pass-through is stronger. With capital inflows, the domestic currency appreciates and the exchange rate pass-through effect will be rapid because this occurs during a boom period. Domestic currency appreciation lowers imported inflation and provides more room for expansionary policy. Inflation and output move in opposite directions if the pass-through effect is strong. What would the central bank do under such conditions? This creates another challenge for the central bank.

Policy Trade-Off under Standard Inflation Targeting

When global liquidity shocks dominate, using a single instrument under ITF may exacerbate the trade-offs. For example, during capital inflows there are two options. The central bank can use the short-term interest rate. If the central bank increases the interest rate, it would lead to further appreciation of the domestic currency and a wider current account deficit,

which would make the economy more vulnerable to a sudden stop. Oppositely, if the central bank decreases the interest rate, it would not help to reduce the risk because the move would ease financial conditions thus feeding higher credit growth and over-borrowing in the domestic economy. Therefore, multiple objectives require multiple instruments. The crisis has taught us that to achieve multiple objectives, we need multiple objectives. A single instrument is not enough to achieve our objectives under these global financial conditions.

Benefits and Costs. The use of macroprudential tools entails a trade-off between the benefits and costs. One of the benefits from using macroprudential tools is lower systemic risk, greater resilience as well as lower frequency and severity of crises. Nevertheless, there is an adjustment cost to the financial sector and balance sheet constraints may take time to phase-in. There are also efficiency costs for borrowers from a reduction in the provision of financial services. The final cost is that output growth will vary across tools. For instance, the aggressive tightening of any one single tool can lead to output costs, which implies any tightening should be done gradually. Macroprudential tools should be used gradually to avoid output costs. At the beginning of the crisis, nobody knew how the macroprudential tools would transmit into the economy, which was another cost and challenge for the implementation of macroprudential tools.

Turkey's Policy Mix Experience

Under such global economic conditions, Turkey's monetary policy has evolved in the past two decades through four distinct periods. In the period from 2001-2005, Turkey experienced a domestic crisis. It was a mixture of a balance of payments, banking and fiscal crisis. We saw the adverse consequences of this crisis in the form of declining GDP growth. After the domestic crisis, however, broad-based structural reforms were implemented. We changed the central bank law because in 2001, the central bank was not

independent. According to the new central bank law, the central bank gained independence. Before 2001, Turkey implemented a fixed exchange rate regime but after the domestic crisis, we started to implement a flexible exchange rate and changed our monetary policy framework to inflation targeting, beginning with implicit inflation targeting. We did not officially implement the inflation targeting framework because the Turkish economy was not in a strong position after the 2001 crisis. During implicit inflation targeting, we took some actions in terms of the fiscal balance and the banking sector. We established some regulatory and supervisory institutions for the financial markets. This was our preparation period for the official inflation targeting framework.

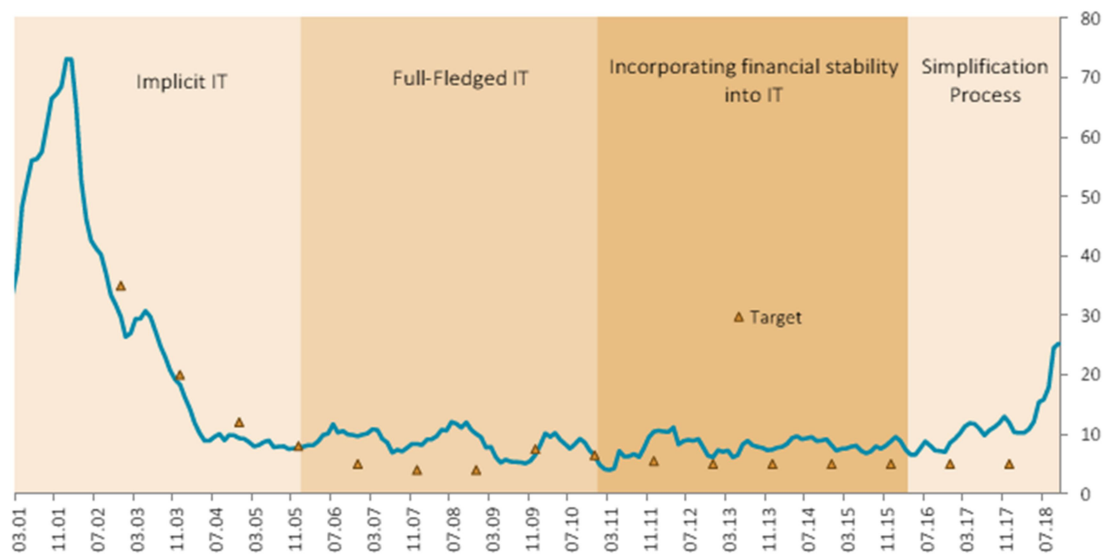
After 2006, we officially started to implement the full-fledged inflation targeting framework. From 2006 to 2010, we implemented full-fledged inflation targeting in a conventional way, using the short-term interest rates and our objective was price stability. After the global financial crisis and the impact on the financial markets, however, we incorporated financial stability into our inflation targeting framework. From 2011-April 2016, was our policy mix period because we incorporated financial stability into our policy objectives. Since April 2016 until the present day, we have implemented a monetary policy simplification process.

Inflation in Turkey: 2001-2018

If you look at the inflation path during these four periods of different monetary policy frameworks, at the beginning, there was a huge crisis in 2001. As a result of structural reforms, there was a long disinflation process during the implicit IT period. After 2006, we implemented full-fledged IT and nearly every year, inflation was above the target. Between the full-fledged IT and policy mix periods, inflation remained above the target but this was acceptable because we did not experience any huge inflation shocks. During the monetary policy simplification process, however, especially during the

most recent period, we experienced a huge exchange rate shock that was reflected by an increase in inflation.

Figure 10.3. Turkey: Inflation



Source: TURKSTAT

Interaction	
Participant:	What was your inflation target during this time?
Speaker:	Now, it is 5%. At the beginning, it was around 7%.
Participant:	What is the base year? I know that during the crisis last year, there was growth since 2003 but that growth is combined with inflation. There was high growth with high inflation so on the ground we can say there is inflation growth similar to the Asian crisis. I have looked at the Article IV for Turkey and the IMF announced there were high vulnerabilities in 2014 and that growth in Turkey came with high inflation as well, along with a lot of external borrowing. The Central Bank of Turkey would have access to these figures so why was nothing seen before the crisis? There was also something about after the

	<p>crisis. If there is a crisis in the local currency, I think the first thing you should do is raise the interest rate but this took a long time in Turkey. Another thing is that you said the Central Bank of Turkey is independent but is it not the case that the Minister of Finance still has influence in the central bank? Can the president interfere?</p>
<i>Speaker:</i>	<p>No, the central bank is independent. In his speeches, the president is always talking about interest rates but we are trying to distance our policies from his influence. Furthermore, exchange rates pass-through is also high in Turkey.</p>
<i>Participant:</i>	<p>I think the central bank did a lot to take into account the vulnerabilities through macroprudential policy but after the Tweet by US President Trump, Turkey experienced a crash.</p>
<i>Speaker:</i>	<p>At the beginning, it was also due to political reasons. Therefore, it was rapid to increase but it also decreased rapidly as well. This was an exchange rate shock.</p>
<i>Participant:</i>	<p>Since you know that there were vulnerabilities, we should take care about these vulnerabilities and make some macroprudential policies to avoid any upcoming crisis but just one Tweet by the President of the United States triggered a downturn. Why did CBRT not take this into account? Why was there no action before the crisis? From Article IV, you can see a large wave coming, almost like a snowball, getting bigger and bigger, but there was no action. The actions came a long time after the crisis.</p>
<i>Speaker:</i>	<p>Actually, they did take it into account. The implemented huge monetary policy tightening and increased the</p>

interest rate. After the monetary policy tightening, the exchange rate started to appreciate as well but in the beginning, they did not take any actions because nobody knew what was going on. Some people were speaking on Twitter and we saw the effect of the Trump speech on exchange rates. While he was speaking, we saw large depreciation. Before the crisis, the central bank was trying policies to contain the adverse effects but you are right, it was not enough. Some pre-emptive actions could have been taken before the crisis. It was very hard with the pressure from the president. We are trying to distance ourselves because we are independent but it is very difficult to implement policies with such pressures. The president believes the high interest rate is the reason for high inflation not that high inflation is the reason for the high interest rates. He thinks that if the interest rates are high, it will have some financing costs for the firms and other economic agents, which leads to an increase in prices. Therefore, there was a lot of support to decrease interest rates but it is not possible all the time to do what he suggests.

Participant:

Based on the graph, your inflation target was consistently below actual inflation. Why did you not just increase the target in order to gain credibility? After you have gained credibility, the central bank could lower the target again.

Speaker:

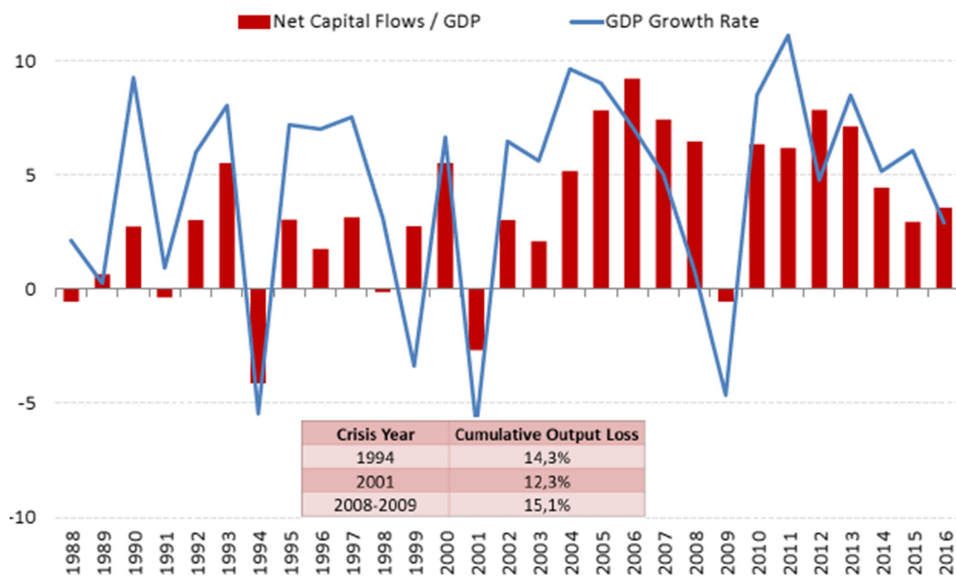
Actually, we did adjust our target at the beginning of full-fledged inflation targeting in 2007-08. During this period, there was a huge increase in the oil price so our inflation was also very high. At the beginning, our medium-term inflation target was 4% but after the external shocks, we

	increased the inflation target to 5%. It is not easy to change the inflation target due to the negative effects. If you regularly change your inflation target, the central bank will lose credibility.
<i>Participant:</i>	What would you do if you do not hit the target at the end of the year?
<i>Speaker:</i>	<p>If we do not hit the target at the end of the year, we have to write an accountability letter to parliament and the president. There was always a reason why we could not hit the target, primarily due to external shocks but food inflation was also very volatile in Turkey, which was another reason we could not hit the target. We did change the target once but to do it too regularly would have negative effects on credibility. Since 2006, our inflation target has remained at 5%. We do have an uncertainty band around the inflation target of $\pm 2\%$. If inflation remains within the target corridor, we do not have to write an accountability letter to the president and parliament. The change in the target is really hard to explain as we saw in our previous experiences. Also, it is the mid-long-term target for the economy, so if you increase it, there could be negative effects on how the economy will evolve in subsequent periods. The central bank does not want to change the inflation target, they just want to fall within the upper bound. After changing the inflation target once, they did not want to do it again.</p>

Sharp Capital Flow Reversals in Turkey are Associated with Large Output Losses. This graph shows the net capital flows and the GDP growth rate. In Turkey, sharp capital flow reversals are mostly associated with large declines

in output growth, or deep recessions. For instance, during the 2001 crisis, the cumulative output loss was around 12.3% and around 15.1% during the global financial crisis in 2008-09. This graph clearly illustrates the structural vulnerabilities in the Turkish economy. The savings are insufficient to handle the investment expenditures, so Turkey needs external finance. Therefore, if there is a sudden stop in the capital inflows, we see a sharp recession in the domestic economy.

Figure 10.4. Turkey: Capital Flows



Source: CBRT, TURKSTAT

Rapid Credit Growth and Currency Appreciation after Quantitative Easing. After the global financial crisis, there were huge capital flows to emerging markets, including Turkey. This was reflected in credit growth and also in the exchange rate. The left graph shows total loan growth in Turkey since the GFC. From the beginning of QE by the Federal Reserve, credit growth started to increase, reaching around 45% (yoy) by 2010. The right graph shows the real exchange rate, with 20% appreciation recorded in one year after QE policy.

Figure 10.5. Turkey: Total Loans Growth
(13 weeks moving average, annualized, FX adjusted, percent)

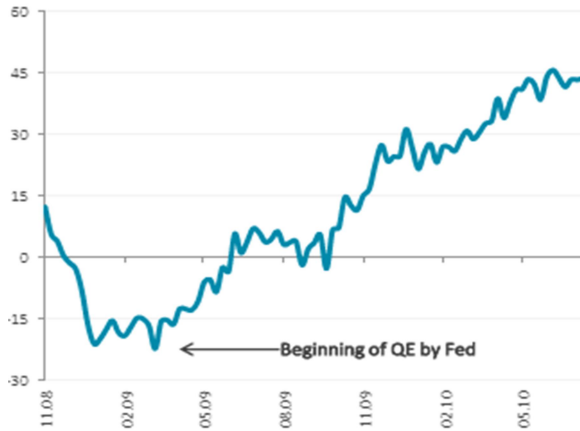


Figure 10.6. Turkey: Real Exchange Rate
(2003 = 100)



Source: CBRT

Sharp Widening in the Current Account Deficit, Financed with Short-Term Inflows. This surge in capital inflow also showed itself in the current account deficit. The current account deficit in Turkey increased to around 7% of GDP in that period. The current account deficit was mostly financed by short-term capital inflows. On the right graph, the red bars show portfolio and short-term flows. Most of the current account deficit was financed by unstable portfolio and short-term flows. In our history, we know that if there is a sudden reversal of capital flows, we will see a rapid contraction in the economy. This is not the case only in Turkey but for all emerging markets. Somebody needed to do something under these conditions. At that point, the central bank was implementing full-fledged inflation targeting with the interest rate as the policy tool. There are also some other institutions in the economy, such as banking supervisory and regulatory institutions. They do not have a macro perspective. They were doing microprudential activities at the individual bank level. They were looking at the individual bank's health without a macro perspective. If you look at bank-level credit growth or other variables, it seemed like there was no problem but from a macro perspective, it revealed a large current account deficit, a huge increase in credit growth

and real currency appreciation, so there were some risks at the macro level. Consequently, some institutions needed to take some steps to contain the macro-financial risks. Therefore, the Central Bank of Turkey took the first step to contain the macro-financial risks.

Monetary Policy Framework

Inflation Targeting (IT). First, the central bank had a conventional inflation targeting framework. In that framework the objective was price stability and the policy tool was the policy rate.

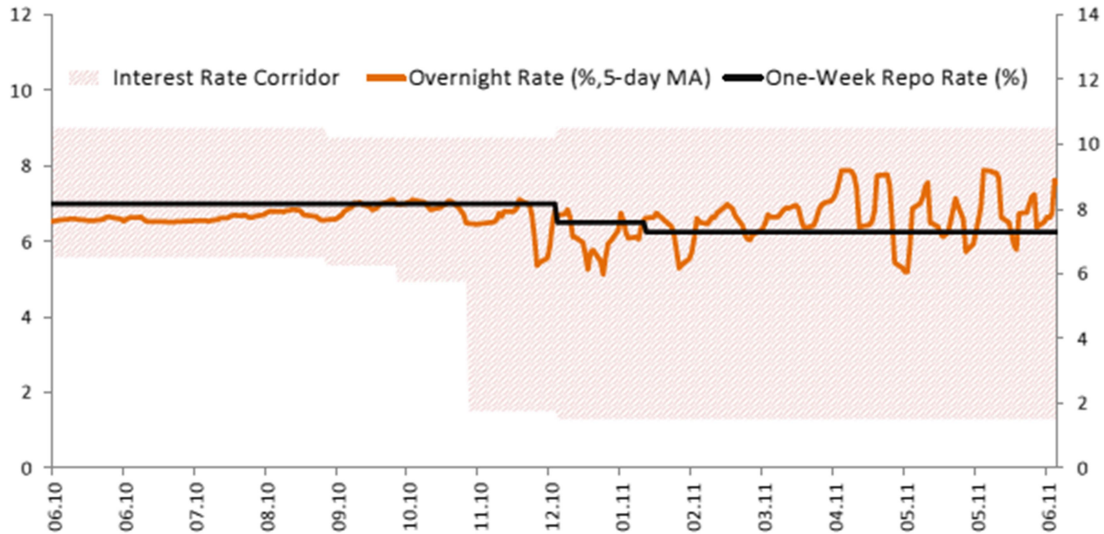
Monetary Policy Framework: Financial Stability Augmented IT. To contain the macro-financial risks, the central bank of Turkey changed its monetary policy framework by incorporating financial stability into the inflation targeting framework. Financial stability became one of the concerns of the central bank, while price stability remained the main objective. Since the central bank now had multiple objectives, it expanded its policy toolkit to include reserve requirement ratios and an interest rate corridor as additional policy tools.

Amplifying Effect of Capital Flows were Contained. The aim of these additional policy tools was to contain the adverse impact of capital inflows to the economy. The aim of the flexible interest rate corridor was like a capital control to decrease the capital inflows in the economy. The aim of the reserve requirements was to contain high credit growth in the economy. By changing the reserve requirements, the central bank tried to control the impact of capital inflows on credit growth rates.

Using Monetary Policy Tools as Macroprudential Instruments. What did we do with the interest rate corridor? On the graph, there is a corridor around the one-week repo rate, which is the policy rate, represented by the black line. The aim of the corridor was to increase the volatility of short-term interest rates. During the easing of global conditions, the central bank widened the interest rate corridor downwards, which increased the short-term interest

rate volatility in order to decrease capital inflows. This could be considered a capital control but the main objective of this policy was to decrease the capital inflows during that period.

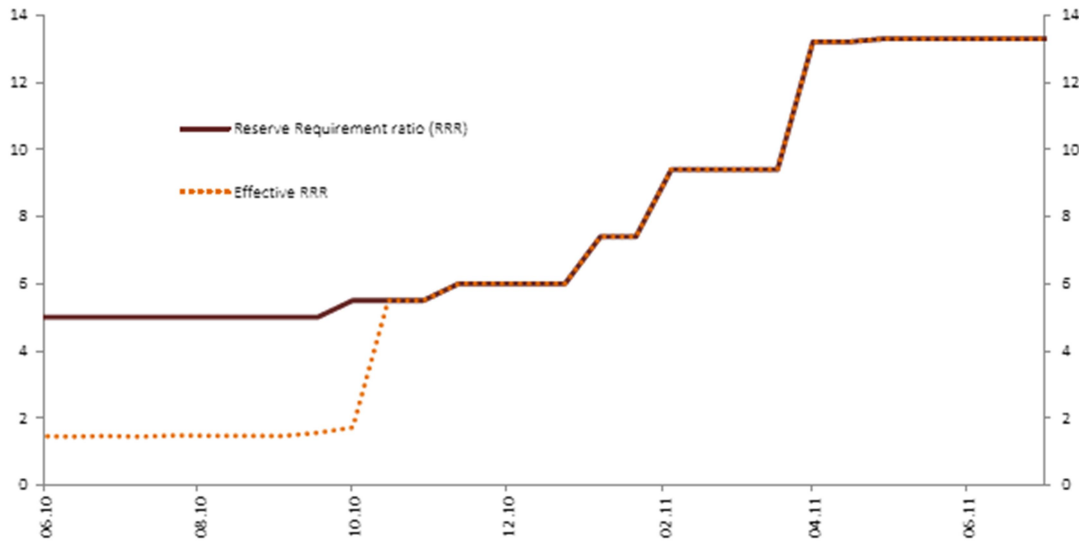
Figure 10.7. Turkey: Interest Rate Corridor



Source: CBRT

In terms of the reserve requirement ratios, before the end of 2010, there was a remuneration on the reserve requirements if the banks were paying interest on the excess reserves. After financial stability was incorporated into the monetary policy framework, the central bank stopped remuneration of the reserve requirements and increased the reserve requirement ratio by almost 10% within one year. The aim of the reserve requirement policy was to contain the increasing credit growth.

Figure 10.8. Turkey: Reserve Requirement Ratios



Source: CBRT

Interaction	
<i>Participant:</i>	How was the transmission to reduce the capital flow by increasing the corridor? Usually, central banks want to make the overnight rate consistent with the policy rate. Can you explain more about how the volatility reduced capital flows? Was it through the risk channel?
<i>Speaker:</i>	The central bank widened the interest rate corridor download, which increased the volatility in the interest rate. You are right, the interest rate was not close to the policy rate but for the central bank, the important thing was to stop the capital inflows. You should not think about policy transmission, the aim of this interest rate corridor was to stop the capital inflows. The policy instrument increased the uncertainty in the financial markets.
<i>Participant:</i>	What is the roof of the corridor? When we have a corridor, we have a ceiling and a lower bound so the volatility is

	restricted within that corridor. That is how the volatility is minimized.
<i>Speaker:</i>	The roof of the corridor is flexible not fixed. Sometimes the corridor is wide and other times it is narrow. The width of the corridor was changed as a policy tool.
<i>Participant:</i>	I understand that if you increase the band, the volatility will increase. I do not understand how the transmission of volatility in the one-week repo rate can hold the capital inflows.
<i>Participant:</i>	I do not think the band is increased or decreased frequently as a matter of policy change. When you have a corridor, it means you are restricting the volatility to ensure smooth policy transmission.
<i>Speaker:</i>	You are right, the volatility of the interest rate is within the corridor but when you widen the band through the lower bound, new capital flows will have low interest rates and therefore be less attractive.
<i>Participant:</i>	Why do not you just decrease the policy rate?
<i>Speaker:</i>	If you decrease the policy rate, credit growth will accelerate further. Our aim at the time was also to control credit growth. For that reason, we used the reserve requirement ratios.

Communication Challenges. We implemented new policy tools, such as the reserve requirement ratios and interest rate corridor, but there were some initial communication challenges. During the conventional inflation targeting period before the global financial crisis, monetary policy decisions were communicated mainly through stable overnight interest rates and inflation. Expectations management was more straightforward as well. When we

started to implement the new policy tools, we faced some communication challenges, especially within this framework. We had multiple objectives that required multiple instruments. It was hard to attach one objective to one instrument, which was a communication challenge. In addition, there was no clear definition of financial stability. For price stability, there is an inflation rate but for financial stability, there is no clear definition. This was a communication challenge for the macroprudential policies. Another challenge was the transmission channel of the new policy tools. They were new for the economy, so it was very difficult to convince the economic agents about the use of these macroprudential tools. This was another challenge for policy implementation.

Interaction	
<i>Participant:</i>	How is the independence of the CBRT set up? To whom does the CBRT report and what happens if the targets are not hit?
<i>Speaker:</i>	To parliament. If we do not hit our targets, we must draft an accountability letter explaining why the targets were not hit. This is our accountability mechanism. We also regularly present to parliament concerning current economic conditions and developments.
<i>Participant:</i>	I just have a quick question about the interest rate corridor. By widening the interest rate corridor, I guess you contain the capital flows, but I was wondering whether or not if there were any other unintentional effects, perhaps on bank funding strategies, for example, or loan pricing.
<i>Speaker:</i>	There are some studies showing the banks taking the upper bound of the corridor when pricing their loans. They no longer took the policy rate as the benchmark, they

were using the upper bound of the interest rate corridor. Therefore, the interest rate corridor does have an effect on loan pricing.

CBRT took some steps to manage these macro-financial linkages. At the beginning, it was very hard due to the communication challenges and uncertainty about these new policy tools, but it also created some awareness in the other financial institutions about these micro-financial risks. After CBRT took some steps to manage the macro-financial linkages, the other institution started to think the risks in a more macro-financial framework.

Financial Stability Committee (FSC): A Significant Step for a Formal Institutional Framework for MaP

The Financial Stability Committee (FSC) was founded in 2011, consisting of five institutions, namely the CBRT, under secretariat of the Treasury, Banking Regulation and Supervision Agency, Savings Deposit Insurance Fund, and the Capital Markets Board. The aim of the FSC is to enhance information sharing, coordination and cooperation between the institutions. The main duties are to assess the systemic risks, identify necessary measures and make relevant policy recommendations to different institutions in order to increase coordination. The main aim of this committee is to increase coordination between the different financial institutions. The FSC has no decision power or tools, the power rests with the authorities represented in the Committee. Each institution still has its own mandate and responsibility but the Committee has increased coordination between the institutions. After establishment of the Financial Stability Committee, we saw a decline in long-term growth because the Banking Regulation and Supervision Agency took some LTV cap measures. It is very important to have coordination between the institutions to see the impact of macroprudential policy tools.

Broad Objectives of Macroprudential Policy

The broad objectives of macroprudential policies were to increase sustained growth prospects, contain credit growth in household over borrowing, improve the quality of external financing and bolster safety nets against external financial shocks. As I showed you previously, the current account deficit was mainly financed by short-term financial sources so one of the aims of macroprudential policy was to improve the quality of external financing, making it longer term and more stable. Another objective was to dampen the financial amplification channels. The aim of these policies was to decrease the interaction between capital flows, credit and exchange rates.

Why Focus on Credit Growth and Household Borrowing? From the literature and previous crises, credit booms are the most robust and significant predictors of financial crises. Furthermore, periods of strong credit growth are typically followed by periods of sluggish economic activity. This is true not only in Turkey, yet also in many other countries. There are many studies in the literature to support these findings. Specifically, a rise in the household debt to GDP ratio predicts lower output growth over the medium run. The main reason for using these macroprudential tools was to focus on high credit growth and household borrowing in order to contain the adverse impacts of over borrowing and excessive credit growth in the real economy.

Macroprudential Measures to Smooth the Credit Cycle and Contain Household Debt were Implemented Two Major Steps. The first round occurred in 2011, when the Financial Stability Committee was founded. Higher risk weights and provisions were put on consumer loans along with limits on credit card payments. Most credit card expenditure was for imported goods, so the authorities wanted to put some limits on credit card payments, especially for imported goods. In addition, the authorities also placed an LTV cap for housing loans. In the second round from 2013-2014, the caps and

limits were increased, and higher risk weights were put on credit cards. Maturity restrictions (36 months) were also introduced for uncollateralized consumer loans and an LTV cap was introduced for vehicle loans. Most recently, with the reversal of the global financial cycle, the authorities have reversed the macroprudential measures by eliminating some of the constraints on consumer loans to stimulate the real economy.

What Was Achieved?

The monetary and macroprudential policy mix in Turkey managed to engineer a soft landing and a gradual rebalancing in the economy. Furthermore, the strong link between economic activity and capital flow volatility has declined to some extent. In other words, the amplification mechanism has been contained to some extent with the help of these tools. Moreover, establishment of the Financial Stability Committee showed the importance of institutional policy coordination, which has become well understood. Well-targeted countercyclical macroprudential policies have improved the policy trade-offs faced by monetary policy. An efficient macroprudential framework requires policy coordination between different policy institutions. It was also well understood that neither monetary policy nor macroprudential policy can substitute deeper structural reforms. Turkey's vulnerabilities stemmed from structural issues, for instance savings were lower than investment thus necessitating external finance, which exacerbated the amplification mechanism between capital flows and domestic macroeconomic variables. If Turkey could reduce its demand for external financing, the country would become less vulnerable to changes in the global financial cycles. The main objective should be to unwind the vulnerabilities, which cannot be achieved long term through monetary or macroprudential policies. Structural reforms are also required. In addition, one challenge associated with the policy mix is that expectations management is much harder within a multiple-objective and multiple-instrument monetary policy

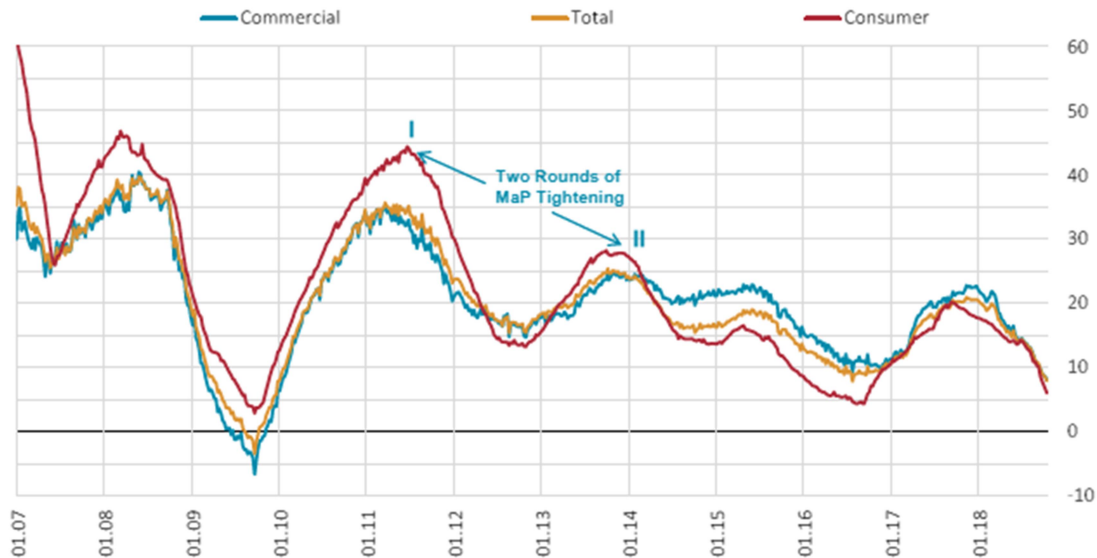
framework. This is complicated further because sometimes the instruments are used in opposing directions.

Interaction	
<i>Participant:</i>	I am curious about the legal framework in Turkey. Since you added financial stability to your objective, it means you have a dual objective. Was that contained in a central bank law? Does CBRT have a dual mandate?
<i>Speaker:</i>	<p>Legally, our main objective is price stability, but we also take into consideration financial stability. In the central bank law, there is no special role stipulated for financial stability. The Financial Stability Committee mostly decides the macroprudential tools. We only have the reserve requirement ratios and interest rate corridor as tools and, through the FSC, we advise the other financial institutions to apply other macroprudential measures.</p> <p>We call it a macroprudential tool. The target is not the price stability objective, the target is the financial stability objective. The banks can also borrow from each other and they also come to the central bank for liquidity because interbank borrowing is insufficient. The financial markets department are using these interest rates while they are providing liquidity to the banking sector. The interbank rate is also within this corridor, which serves as a benchmark for interbank rates. This influences the banks but the aim is primarily to increase short-term interest rate volatility in order to decrease the attractiveness of capital flows. Through auctions, they change short-term interest rates within the corridor in order to decrease the attractiveness of capital flows.</p>

<i>Participant:</i>	What is the current loan-to-value ratio? Has it had an effect on house prices?
<i>Speaker:</i>	I am not sure the current LTV ratio. It has not had an impact on house prices. The impact was on housing loans.
<i>Participant:</i>	How frequently do you change your band? Are the loan rates pegged to the band?
<i>Speaker:</i>	Not immediately. They are changing the amount of the liquidity they provide to the banking system. The banks need central bank funding because interbank funding is insufficient to meet their financial needs. They can change the band at the monthly meetings as well as the width of the corridor. They can change the funding amount to the banking system. They are just changing the amount of liquidity they provide to the banking system. Our policy rate is currently 24% because of a recent shock that triggered a huge increase in inflation. Consequently, we tightened monetary policy. We now operate a fixed corridor without changing the width of the band.

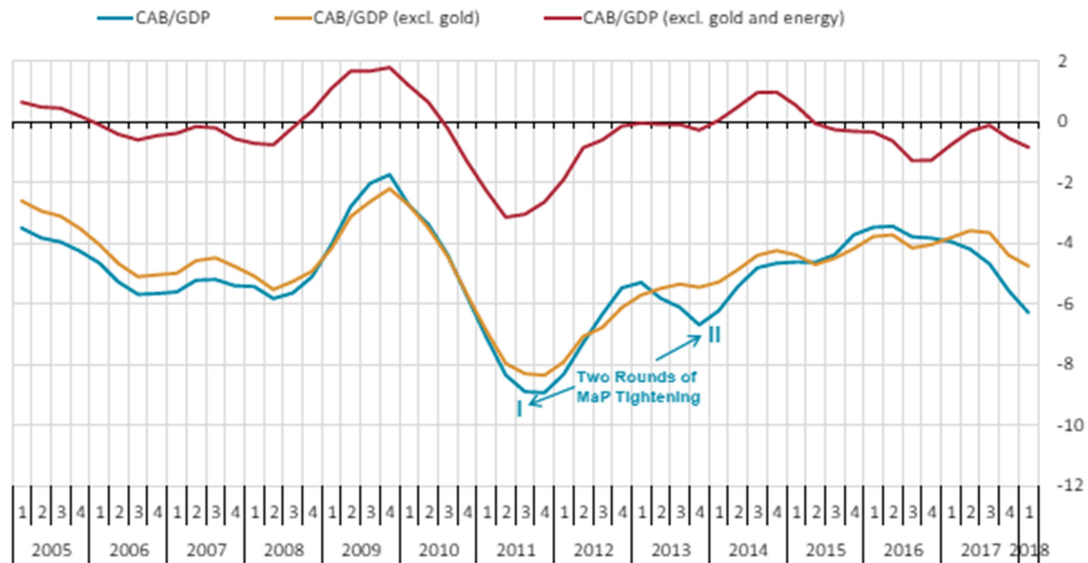
Credit Growth. In terms of what was achieved by the monetary and macroprudential policy mix, this graph shows the change in credit growth. The blue I and II indicate two rounds of macroprudential policy tightening to smooth credit growth. After implementation of two rounds of macroprudential tightening, credit growth was observed to decline. The aim of the macroprudential tools was to contain the consumer loans. The red line shows the change in consumer loans and the blue line shows the change in commercial loans. The impact was most significant on consumer loans. The aim was to contain the over borrowing of households and we see the impact of these macroprudential tools on consumer loans. On the other hand, commercial loans were largely unaffected.

Figure 10.9. Turkey: Consumer and Commercial Loans
(Adjusted and Exchange Rate Effect, Annual Percentage Change)



Current Account. In terms of the current account deficit, after implementation of two rounds of macroprudential tightening, we saw a positive impact on the current account. The graph shows a narrower current account deficit after both rounds of macroprudential tightening because we implemented some constraints on the expenditures to imported goods, similar to the consumer loans, as most of the consumer loans are going to imported goods. We saw these implications on the current account deficit as well. I do not have a graph to show how the current account deficit is financed by short-term or long-term sources, but after macroprudential tightening, most of the current account deficit was financed through long-term sources. This was another positive development for the impact of macroprudential tools.

Figure 10.10. Turkey: Current Account
(12-Month Cummulative, %GDP)



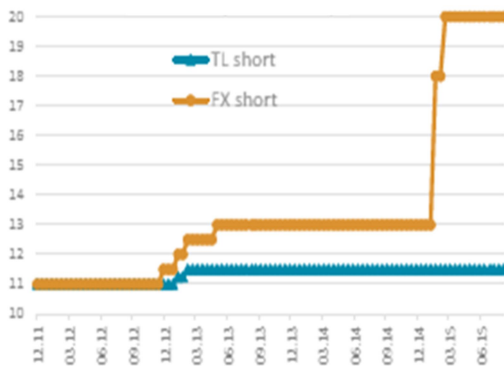
Source: CBRT

Reserve Requirements were used in Several Dimensions to Improve the Quality of External Finance and Bank Liabilities. To contain credit growth, we also used reserve requirements to increase the quality of external finance. This slide shows the change in the reserve requirements for different dimensions. The top-left graph shows Turkish lira and foreign currency reserve requirement measures. We increased both the Turkish lira and foreign currency reserve requirement ratios, but the change in the foreign currency reserve requirement ratio was significantly higher than the Turkish lira reserve requirements. We also differentiated the reserve requirements for core versus non-core foreign currency liabilities of the banks. The top-right graph shows the difference between the core and non-core foreign currency liability reserve requirements. For non-core foreign currency liabilities, we implemented higher reserve requirements because we wanted to increase the

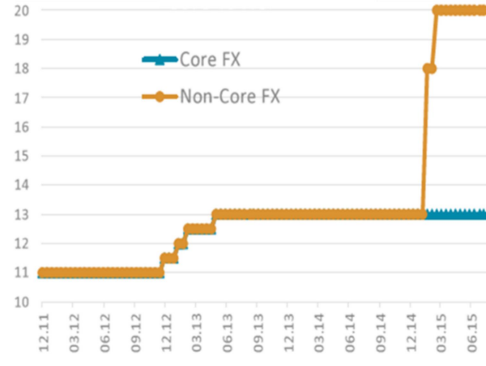
quality of external finance. CBRT wanted the banks to have more stable funding, so CBRT increased non-core foreign currency liability reserve requirements more substantially than the core foreign currency liabilities. The bottom two graphs show the differentiation between the maturity-based reserve requirement measures. The left panel shows short versus long term core liability reserve requirements. We see no change in the core long-term Turkish lira liabilities. Core means deposits. CBRT wanted the banks to have stable long-term core liabilities so CBRT increased the short-term reserve requirements for core Turkish lira liabilities. The right panel shows the short versus long-term non-core liabilities. We see a similar approach here as well. CBRT wanted the banks to have long-term non-core liabilities to increase the quality of external finance so we see a huge increase in the non-core short-term liabilities of the bank. We see the impact of these different reserve requirements on the banks' foreign currency liabilities.

Figure 10.11. Turkey: Reserve Requirement
(based on currency)

TL vs FX (short term)

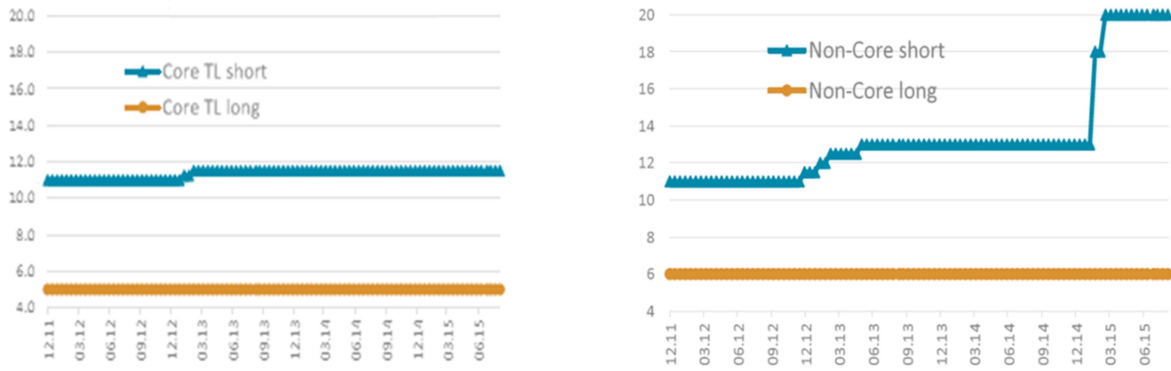


Core vs Non-core (FX)



Short vs Long (core)

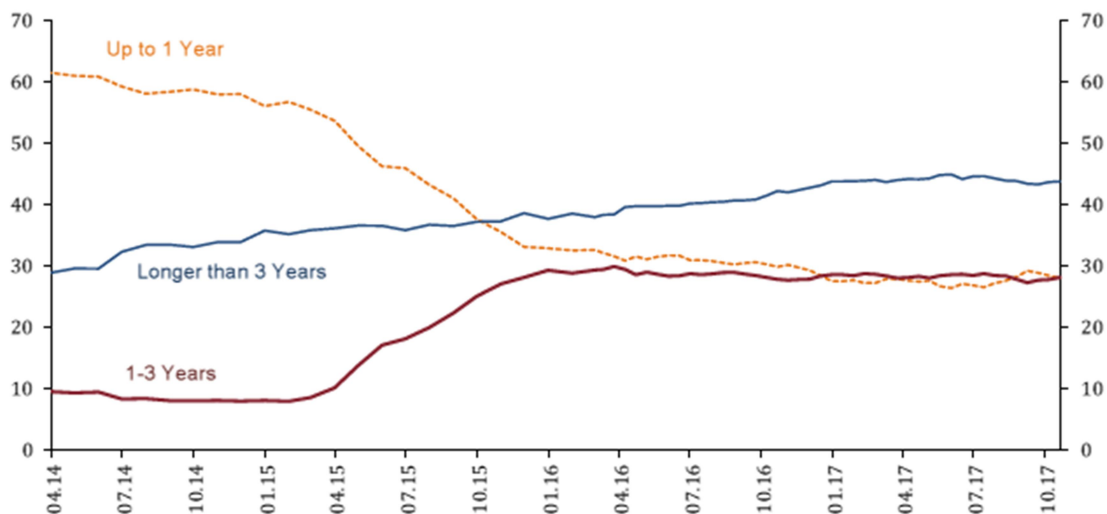
Short vs Long (non-core)



TL: Turkish Lira; FX: Foreign exchange
Source: CBRT

Maturity of Non-Core Liabilities has Improved. This graph shows the maturity composition of foreign currency non-core liabilities. The orange dotted line shows the short-term foreign currency liabilities of the banks. The blue line shows the long-term foreign current liabilities of the banks (more than 3 years) and the red line shows the medium (1-3-year) foreign current liabilities. The measures were taken at the end of 2014 and we subsequently saw a rapid decrease in the share of short-term foreign currency liabilities, while the long and medium-term foreign current liabilities increased after these measures were introduced at the end of 2014.

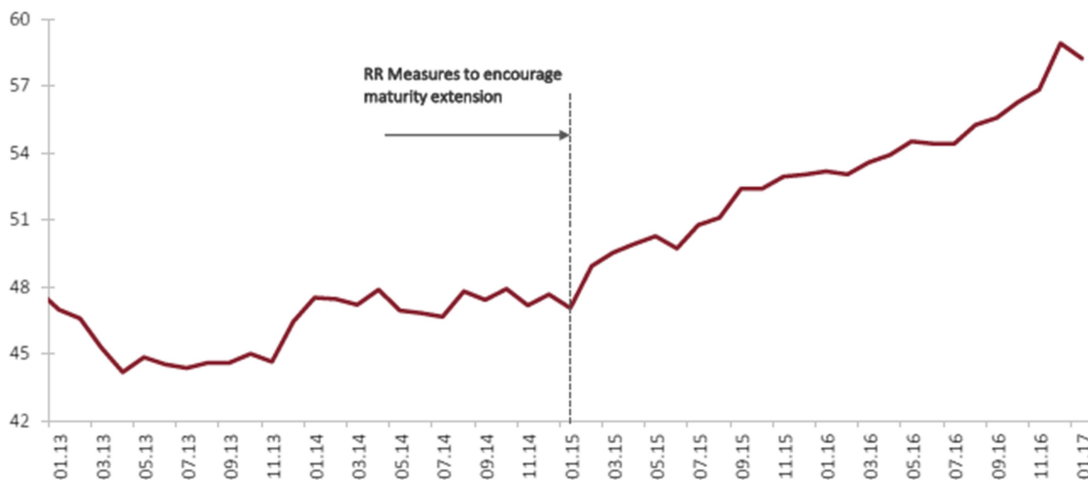
Figure 10.12. Turkey: Maturity Composition of FX Non-core Liabilities
(Percentage share)



Source: CBRT

Average Maturity of Banks' External Liabilities has increased Considerably.
The average maturity of the bank's external liabilities increased considerably after the measures were introduced at the end of 2014. We saw some implications on the quality of the external finance through such differentiation in the reserve requirement measures.

Figure 10.13. Turkey: Average Maturity of Non-core FX Liabilities
(Months)



Source: CBRT; CMB; PDP

Recent Developments in Turkey

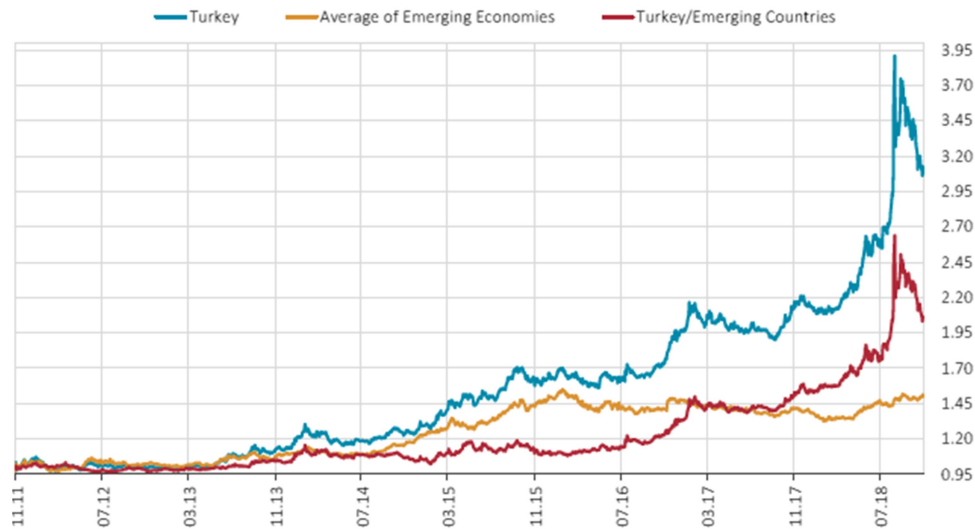
Reversal of the Global Financial Cycle

The Turkish economy has been hit by a series of adverse events in recent years, including escalating geopolitical uncertainties, tighter global financial conditions, rising protectionism, higher oil prices and a deterioration in bilateral relationships with some of Turkey's traditional partners. The Federal Reserve has stopped quantitative easing policy and started to normalize monetary policy, which has led to a reversal of the global

financial cycle. The series of adverse events have led to a further deterioration in risk sentiment, weaker external flows and exchange rate depreciation pressures. There has also been a huge sell-off of Turkish assets.

Relative Value of Turkish Lira. The blue line shows the value of the Turkish lira, the orange line is the average value of emerging economies' currencies and the red line shows the relative value of the Turkish lira. In the last year, there has been a huge depreciation of the Turkish lira due to a series of adverse events. During the few months from May to August, the Turkish lira depreciated by almost 50% before subsequently rebounding. There was huge uncertainty during that period and we see the implications of that in the exchange rate, while other emerging markets enjoyed more stable exchange rates.

Figure 10.14. Turkey: Relative Performance of Turkish Lira against USD
(01.11.2011= 1)

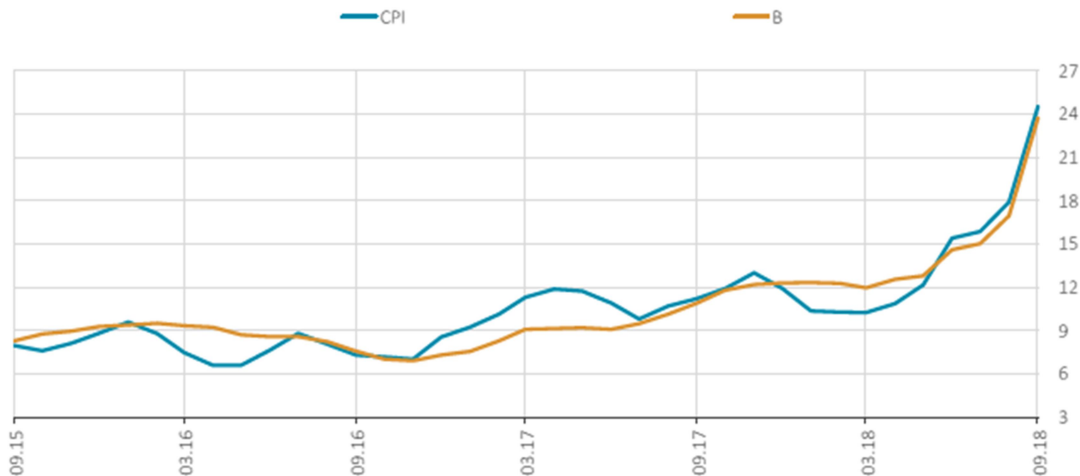


Source: CBRT

Aggregate Demand. Since financial market uncertainty increased during that period, we also see implications in terms of aggregate demand. Financial market uncertainty and exchange rate uncertainty negatively affected aggregate demand. Banks were also less eager to lend in the uncertain environment, which also undermined aggregate demand.

CPI and Core Inflation. The decrease of aggregate demand also had an impact on inflation. Exchange rate pass-through is very high in Turkey, however, so the exchange rate shock fed through to a huge and rapid increase in inflation. Furthermore, the uncertainty also led to an increase in terms of exchange rate pass-through. The pricing behavior of economic agents was also negatively affected because they did not know what would happen to the domestic currency in the subsequent periods. Therefore, expectation formation and expectation management were also adversely affected during this period of turmoil and we see it reflected in inflation.

Figure 10.15. Turkey: CPI and Core Price Index (B)
(Annual, % change)



Source: CBRT; TURKSTAT

Reversal of the Global Financial Cycle and Gradual Normalization of Monetary Policy

CBRT has formulated an integrated approach since 2016 to achieve and maintain low and stable inflation. CBRT has pursued price stability-oriented monetary policy, complemented by simplifying the monetary policy framework. Volatility in the central bank funding rate has been gradually reduced and, as of June 2018, the one-week repo rate was restored as the policy rate of CBRT (a single policy rate) instead of the interest rate corridor.

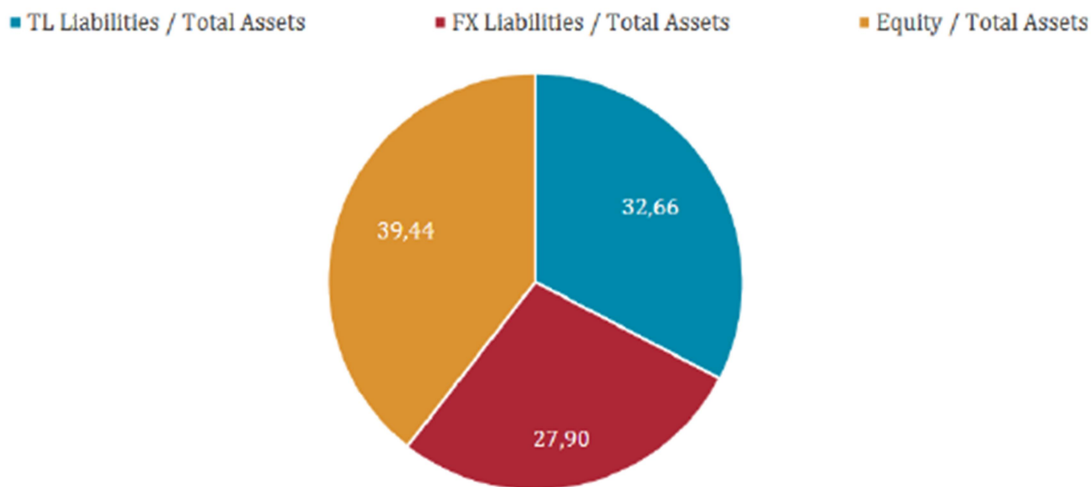
There is still an interest rate corridor but its width is fixed. CBRT also identifies structural impediments to disinflation, while promoting a coordinated effort among all relevant institutions to address further challenges, particularly related to changes in global risk sentiment. To minimize the adverse impact of huge uncertainty and exchange rate shocks, CBRT first implemented frontloaded and pre-emptive monetary tightening, which prompted exchange rate appreciation. CBRT also implemented some Turkish lira and foreign currency liquidity measures by easing reserve requirement policies due to huge uncertainty when the banks required liquidity. Therefore, the central bank provided liquidity by easing the reserve requirements for the banks. CBRT also made rediscount credit and swap arrangements due to the uncertainty surrounding foreign currency.

Recent Macprudential Measures

The Financial Stability Committee has also taken some measures in response to less accommodative global liquidity conditions by reversing macroprudential tightening in terms of consumer loans. The maturity of consumer loans was also increased, while decreasing the limits on consumer loans. The FSC also implemented a two-pillar approach to contain risks emanating from FX borrowing by non-financial corporations. A decree was issued, effective from May 2018, that requires firms with less than a USD15 million credit balance to maintain sufficient foreign currency revenues to meet their current FX debt, targeting SMEs because there was a huge increase of foreign currency in the domestic currency. If a firm had a foreign currency loan after the exchange rate shock, it was very difficult to repay the foreign currency liabilities. For larger non-financial corporations, CBRT implemented more effective balance sheet monitoring. CBRT has been constructing a timely, standardized and detailed database of firms' foreign currency exposures that includes currency and maturity-based foreign currency liabilities and assets. The data is collected on a quarterly basis.

Financial Liabilities of Corporate Sector at Reasonable Levels. The financial liabilities of the corporate sector are now at reasonable levels. The figure shows a reasonable level of indebtedness and leverage ratios of non-financial companies listed on BIST.

Figure 10.16. Turkey: Indebtedness and Leverage Ratios of Non-financial Companies Listed on BIST
(% share)



Source: FINNET; Public Disclosure Platform

Recently Released Data Points to a Halt in the Contractionary Trend. More recently, there have been positive signs in terms of credit growth, with recently released data pointing to a halt in the contractionary trend. We saw an increase in credit growth in the first quarter of 2019.

Concluding Remarks

Central banks have a large number of instruments and many tools to deal with spillovers from large capital flows, exchange rate volatility and

credit booms but the Turkish experience highlights some challenging aspects regarding policy design, namely to decide which measures would best target the risks at the source in a timely manner without knowing the real transmission mechanism. In addition, macro-financial stability requires multiple instruments to achieve multiple intertwined targets, which necessitates effective coordination amongst policy institutions. Policy actions require a comprehensive perspective from all shareholders to assess potential externalities and avoid possible unintended consequences. Given the highly integrated international financial markets, domestic policy designs need to take into account possible spillovers from changes in external funding conditions.

Interaction	
<i>Participant:</i>	Is the inflation rate is the impact of Turkish lira depreciation or a supply-side effect? In terms of setting annual economic growth, which institution in Turkey is responsible for setting the annual economic growth target?
<i>Speaker:</i>	It is mostly the depreciation of the Turkish lira because the exchange rate pass-through is very high in Turkey and there was huge uncertainty at that time, so the pricing behavior of the economic agents was negatively affected. Therefore, they reflect the rapid change in the exchange rate to prices, not supply-side driven. We can think of it from a supply-side perspective because there are many imported goods in the price index, but it was mostly exchange rate driven. Regarding your second question, the Ministry of Finance publishes a yearly program, setting the growth targets within that program.
<i>Participant:</i>	Do you have any special policies to deal with your high current account deficit? In terms of the exchange rate pass-

	through and large current account deficit, do you have any special policies to deal with that?
<i>Speaker:</i>	They are trying to contain the imported expenditures. We use macroprudential tools to control the current account deficit by containing the imported expenditures but we do not have a specific tool. They are working on structural policies to create more value-added exports but we do not have any <i>special</i> tools.

Empirical Study

In this session, I will explain some research at CBRT about macroprudential policy implementation. I will discuss some studies on macroprudential policy implementation in Turkey. The first paper I will present is about global liquidity and the impairment of local monetary policy transmission. It tries to understand why we need macroprudential policies and the impact of global liquidity conditions on domestic monetary policy transmission. The second paper I will present is about the transmission mechanism of reserve requirement ratios. The title of the paper is Reserve Requirements, Liquidity Risk and Bank Lending Behaviour. The last paper is about systemic externalities due to risky foreign currency loans, which explores the impact of risky foreign currency borrowing on the banks' lending behavior after a currency depreciation shock. The name of the paper is Foreign Currency Risk, Systemic Externalities and Real Effects.

Why Turkey?

Turkey has been quite active in its use of macroprudential policies in recent years, applying a wide range of tools to impose restrictions on both borrowers and financial institutions. The design and implementation of the macroprudential policy framework in Turkey reflects a purely emerging

economy perspective, where special emphasis has been given to the role of capital flows.

Global Liquidity and the Impairment of Local Monetary Policy Transmission¹³

We are still working on this paper and welcome any comments and feedback. In this paper, our question is how global liquidity conditions impair local monetary policy transmission. This paper is about the interaction of global liquidity conditions, local credit markets and domestic monetary policy. How do global liquidity conditions affect local monetary policy transmission? For instance, the central bank implements a tightening policy by increasing the interest rate in order to tighten economic conditions and increase economic activity. If the global liquidity conditions encourage the banks to borrow from foreign lenders, they will not implement the change in domestic monetary policy to their own loan rates. This leads to a decline in the efficiency of local monetary policy transmission. Therefore, we have tried to understand how these global liquidity conditions impact domestic monetary policy transmission.

Motivation

There has been a dramatic increase in international financial linkages over the last few decades. There is also a large debate in the literature over the ability of local policymakers to steer their domestic financial conditions in the face of huge capital inflows. In this paper, we try to understand to what extent global liquidity conditions affect the strength of domestic monetary policy transmission. We are trying to understand the impact of global liquidity conditions on the bank lending channel of monetary policy. The monetary policy authority sets the policy rate, which the banks take into account in their lending behaviour because an increase in the policy rate

¹³ Fendoglu, et al. (2019)

increases the banks' funding costs, with implications on credit supply and lending rates. In the literature, there are many papers looking at how banks react differently depending on their ability to insulate their loan portfolios from changes in monetary policy, including bank capital, liquidity and size. Do larger banks with more capital and liquidity react differently to banks with different characteristics? We also included the global liquidity exposure dimension to these characteristics. A bank is exposed to global liquidity conditions if it has more foreign currency non-core liabilities, such as borrowing from the wholesale market in a foreign currency. We are trying to understand if these banks have different lending behavior compared to less exposed banks after local monetary policy tightening.

We are also looking at the risk-taking channel of monetary policy. By risk-taking channel, we mean that does looser monetary policy encourage commercial banks to extend credit to riskier firms because the easier liquidity conditions help the banks to take more risk. We look at how bank lending and the risk-taking channel may differ for domestic monetary policy in an emerging market economy.

Another motivation for this paper is to understand how global liquidity conditions affect local credit market conditions. We are trying to understand three interactions. Local monetary policy is set and one of the aims is to influence local credit market conditions, but global liquidity conditions have an impact on this transmission mechanism. The mechanism is through carry trade after local monetary policy tightening since the banks that are more exposed to global liquidity are able to borrow more from abroad. If global liquidity conditions are easier, they reflect less the change in the local monetary policy conditions to their loan rates because they are able to borrow more from abroad so they do not require central bank funding. Consequently, local policy tightening will be less effective under these conditions. Since changes in local monetary policy do not have an effect on foreign lending rates, it creates a carry-trade mechanism for the banks, which

is the underlying mechanism. Our paper provides sharper identification and inferences for these channels.

Data

We use Credit Registry data from Turkey to answer these questions. Credit registry data is micro-level supervisory data that contains very important information, such as which bank is lending to which firm, how much, at which rates and maturity as well as the collateral of such loans, risk provisions and so on. Credit registry data is very valuable. In the literature, many papers are using credit registry data in their analyses. Credit registry data encompasses the universe of corporate loans granted by all banks operating in Turkey, with unique lender and borrower identifiers, interest rates, loan outstanding, currency of the nomination, maturity, collateral property, cash versus non-cash, loan origination and termination dates and loan risk rating. This is very detailed granular information.

We studied the period from January 2006 - December 2016, looking only at local (domestically-owned) banks, with a sample of 20. We exclude foreign banks from our analysis because foreign banks can borrow from their headquarters if there is a local monetary policy tightening. The impact is seen on locally-owned domestic banks. There are a total of 881,606 firm-month observations. We categorize eight loan types, including domestic versus foreign currency, short (< 1 year) versus long-term, collateralized versus non-collateralized.

Empirical Strategy: Identification

Identification is based on firms that borrow from multiple banks with different levels of reliance on global liquidity. We use the variation in the banks' reliance on global liquidity because different banks have different access to global liquidity. We use this variation in access to global liquidity in our analysis. We look at the impact on similar types of loan, such as the same currency of the nomination or similar maturity and collateral properties. We

also explore whether firms switch banks after a local policy tightening. We did this for the robustness analysis.

Empirical Framework

Baseline. The empirical framework in this project was to look at the impact of variations in banks' exposure to global liquidity on their lending behavior. In this regression, the dependent variable is the interest rate on a loan that bank b provides to firm f with type a at time t . The important coefficient for us is this interaction coefficient with the change in the domestic monetary policy and the foreign funding ratio of the bank. The foreign funding ratio of the bank is a measure of the bank's exposure to global liquidity. If a bank is more exposed to global liquidity, it has a higher foreign funding ratio. Therefore, we try to understand how these types of bank, that have more access to global liquidity, change their lending rates in response to an increase in the monetary policy rate. We also look at whether banks with a higher foreign funding ratio react differently to other banks. In our regressions, we also have a bunch of controls for domestic economic conditions, such as domestic economic activity indicators, exchange rate and monetary policy rate. We also added a bunch of controls for firms' demand in our regressions.

Global Liquidity vs Transmission. For the impact of global liquidity on transmission, we also added global liquidity indicators into our regressions as an interaction variable. For the global liquidity indicators, we used VIX as a benchmark indicator for global liquidity. An increase in the VIX implies a tightening in global liquidity conditions. We also use the Federal Reserve balance sheet size, US monetary base or the Shadow Federal Funds Rate as global liquidity indicators. We also checked if our results were robust to these alternative global liquidity indicators. The main question that we want to answer is whether easier global liquidity conditions make globally funded local banks set lower loan rates after a domestic monetary policy tightening? And, does it differ for risky and non-risky firms?

Risk-Taking. We also analyze the risk-taking behavior of the banks. We interact the firm risk indicator variable with the foreign funding ratio of the banks and the monetary policy interaction. The firm risk indicator is an indicator variable of whether a firm has defaulted ex-ante on any loan at a bank prior to borrowing at time t . Our hypothesis is that banks with a higher degree of reliance on global liquidity raise their lending rates less for ex-ante risky firms following a domestic monetary policy tightening.

In the literature, most papers are looking at the impact of easier monetary policy on risk-taking behavior but in our case, we are looking in an alternative way by observing the impact on bank risk-taking when there is local monetary policy tightening.

In this regression, we also add interactions of monetary policy with other bank controls, such is the size of the bank, the liquidity ratio of the bank and the capital ratio of the bank.

Results

Bank Reliance on Global Liquidity and Transmission. I did not put a results table here, I have only included the benchmark results. The regression results show that banks with higher reliance on global liquidity set their loan rate 29bps lower than a bank with a lower reliance on global liquidity after a cumulative 100bps increase in the monetary policy rate (for a given firm). In other words, as domestic monetary policy is tightening, banks are raising their lending rates but if a bank is more exposed to global liquidity and, therefore, able to borrow from a foreign bank or financial market, it would raise its lending rate less than a bank with less borrowing from abroad. That is the baseline result. The table shows the interaction coefficients for different bank characteristics. From the table, the most important bank characteristic is the foreign funding ratio. The impact of other bank characteristics is insignificant and the economic impact is less than the foreign funding ratio.

Global Liquidity vs. Transmission. Is the banks' planning behavior different under different liquidity conditions? From the triple interaction, we see that when $\log(\text{VIX})$ is lower, namely that global liquidity conditions are easier, banks with higher reliance on global liquidity raise their loan rates by 36bps less than banks with a lower reliance after a cumulative 100bps increase in the domestic monetary policy rate (for a given firm). From the table, we see the impact of policy tightening on the loan rate is highest in terms of the foreign funding ratio under different global liquidity conditions.

Bank Reliance on Global Liquidity and Risk-Taking. For a given ex-ante risky firm, banks with higher reliance on global liquidity raise their loan rate by 10bps less than a bank with lower reliance, after a cumulative 100bps increase in the monetary policy rate. This means that if a bank is more able to borrow from abroad, it will show more risk-taking behavior after local monetary policy tightening because the bank has greater access to foreign funds so it can take more risk and lend more to riskier firms.

This effect is higher when global liquidity conditions are easier. When $\log(\text{VIX})$ is lower by one standard deviation, banks with higher reliance on global liquidity raise their loan rate to a risky firm by 40bps less and to a riskless firm by 35bps less compared to banks with a lower reliance, after a cumulative 100bps increase in the domestic monetary policy rate. A risky firm means a firm that has previously defaulted on a loan. If global liquidity conditions are easier, banks behave with risky and riskless firms in a similar way. Easier global liquidity conditions exacerbate this behavior.

Interaction	
<i>Participant:</i>	Concerning the regression itself, I see that you take up to 3-month lags. What is the reason for this? Foreign funding is a binary variable? Is it continuous? You have presented it as high versus low so I am wondering if there was a threshold?

<i>Speaker:</i>	The data is monthly and the impact is quarterly, so there is a 3-month lag. Foreign funding is a bank characteristic, expressed as a function of non-core liabilities to total liabilities. It is a continuous variable, changing over time. There is no threshold, it is continuous over time.
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Mechanism: Data (Carry Trade)

Regarding the mechanism, we showed that banks exposed more to global liquidity conditions set lower rates compared to less exposed banks after a local monetary policy tightening because they are able to borrow more from abroad. We showed that banks with more exposure to global liquidity conditions tend to borrow more after a local monetary policy tightening. To show this mechanism, we use a different database showing cross-border lending through micro-level data. In the database, we see which local bank is borrowing from which foreign bank in which currency as well as the amount and so on. We use this dataset to see whether after a local monetary policy tightening, the banks with ex ante more exposure to global liquidity borrow more. In this dataset, we also see the jurisdiction in which the foreign bank is located as well as its headquarters. We control this information in our analysis to control for the supply side. We ran a regression to see how these banks with a high foreign funding ratio change their cross-border borrowing after a local monetary policy tightening. We added the interaction between local monetary policy and the foreign funding ratio of the bank with a bunch of controls for the supply side. The dependent variable is quarterly change in the logarithm of domestic bank b 's volume of (or the cross-border interest rate on) borrowing in currency c from the global bank subsidiary g whose headquarters is in country h . The question we want to ask from this regression is whether domestic banks *demand* more funds from abroad after a local policy tightening?

Our regression showed that following domestic monetary policy tightening, local banks with higher foreign funding borrow (demand) more funds from abroad. Since we do not have any impact on foreign interest rates, after a local monetary policy tightening, the banks have a relatively lower interest rate for foreign funding, which creates a carry trade mechanism for the banks. Consequently, as the local monetary policy tightening does not have any impact on foreign interest rates, which leads to carry trade, the banks borrow more from abroad after a local monetary policy tightening.

Conclusion

Our paper shows that easier global liquidity strongly attenuates the transmission of a tightening of local monetary policy rates on bank loan rates. This creates looser credit standards for banks with higher reliance on global liquidity. In terms of the risk-taking channel, we found that globally funded local banks set lower rates for ex-ante risky firms following a local policy tightening. The main mechanism of these results is the carry trade, with globally funded local banks borrowing more from abroad after policy tightening. This demonstrates a need for macroprudential policy actions to enhance monetary policy transmission because the banks that are more exposed to global liquidity conditions do not reflect the change in the domestic monetary policy. Therefore, to increase the effectiveness of local monetary policy transmission, we need macroprudential actions. When we extrapolated the results to when global liquidity cycles and domestic monetary policy are synchronized, the results became insignificant. We see that macroprudential tools help to strengthen monetary policy transmission when global liquidity conditions are easier. This provides positive evidence for the use of macroprudential tools when the global liquidity cycle is stronger to enhance local monetary policy conditions.

Interaction	
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<i>Participant:</i>	You said that carry trade increases when the VIX increases. Intuitively, it should not be like that. It should be more correlated with LIBOR or the bond market. It seems to me that the foreign banks are somehow going into the derivative market to get the loans. Maybe you could share how macroprudential policy actions would help in this case.
<i>Speaker:</i>	The derivative markets are off-balance sheet items so this could not be explored.
<i>Participant:</i>	I think this is great research and a very interesting presentation. You are using very big panel data with millions of variables for the estimation. There is an assumption, however, of symmetry between monetary policy tightening and loosening. I feel there is some differences between the two and perhaps you could separate monetary policy tightening and loosening.
<i>Speaker:</i>	I agree, we need to check if there is an asymmetric effect of local monetary policy tightening and loosening and what the impact is of global liquidity conditions on the easing and tightening of domestic monetary policy.
<i>Participant:</i>	Are there any bank regulations to hedge against foreign funding? Do you also differentiate between the type of ownership of the bank, for example foreign banks or local banks?
<i>Speaker:</i>	There are some regulations. If there is an open FX position (more FX liabilities than FX assets) on the balance sheet, the bank is required to hedge using off-balance sheet items, such as derivatives or swaps. Furthermore, the open FX position must not exceed a certain threshold of

	<p>the bank's equities. There is a regulation that the open FX position has to be less than 5% of total equity. In Turkey, we have many foreign and state-owned banks but in this analysis we only used locally-owned banks and state-owned banks, the foreign banks were excluded from our research.</p>
<i>Participant:</i>	<p>Do you know how your results compare with the literature in terms of what you found and the coefficients?</p>
<i>Speaker:</i>	<p>There are no papers that look at the impact of foreign funding ratios on local monetary policy tightening but there are other papers that look at other bank characteristics, such as size, capital and so on, which we also included in our regressions. We do have results consistent with the existing literature on those kinds of bank characteristics.</p>
<i>Participant:</i>	<p>You only look at the Federal Reserve's balance sheet. Is that because most of the funding comes from the United States and not from Europe? Could you perhaps look at the ECB's balance sheet? What would happen to your results using the ECB's balance sheet? I am not sure of the characteristics of where the funding comes from.</p>
<i>Speaker:</i>	<p>We used these measures of global liquidity indicators because they are the most commonly used indicators in the literature. The Federal Reserve's balance sheet is the main driver of global liquidity and also US monetary policy is the same. We just followed the literature. You are right though, nowadays the ECB is still implementing QE policy, whereas the US Federal Reserve has already stopped. Our sample ends at the end of 2016, so for now it</p>

	is okay but we should take into account other advanced economies' balance sheets as well.
<i>Participant:</i>	Have you included Islamic banks as well?
<i>Speaker:</i>	We did not include Islamic banks because they have a different structure

Reserve Requirements, Liquidity Risk and Bank Lending Behaviour¹⁴

The second paper is about reserve requirements, liquidity risk and bank lending behavior, published last year in the *Journal of Money, Credit and Banking*. I would like to briefly explain their findings.

Motivation

Following the global financial crisis, the size and volatility of capital flows into emerging market economies have increased substantially. This has created financial and macroeconomic stability challenges for emerging market economies, such as keeping policy rates at low levels in order to avoid excessive appreciation of domestic currencies, while engaging in macroprudential tightening to curb rapid credit growth. Therefore, reserve requirements have been one of the most commonly used tools among unconventional monetary policy instruments. This paper looks at the empirical evidence for the transmission channels of reserve requirements, identifying a new channel (liquidity channel), which works through the availability of liquid assets.

Table 10.1. A Hike in the Reserve Requirement Ratio and Bank Balance Sheet

Before a hike in RR		After a hike in RR	
Assets	Liabilities	Assets	Liabilities
Loan: 90 Unencumbered securities: 10	Deposits: 100	Loan: 90 Unencumbered securities: 5	Deposits: 100

¹⁴ Alper, et al. (2018)

Encumbered securities: 0 Reserves: 0	Repo: 0	Encumbered securities: 5 Reserves: 5	Repo: 5
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Source: Alper, et al. (2018)

The table shows an example balance sheet of a bank, showing the impact of a change in the reserve requirements. Before an increase in the reserve requirement, on the asset side, we suppose the bank has a loan of 90 Turkish lira and 10 unencumbered securities. Therefore, the total assets of the bank is equal to 100. On the liability side, the bank has deposits totaling 100 Turkish lira. After the change in reserve requirements, however, the bank maintains deposits totaling 100 Turkish lira but the bank must meet the increase in the reserve requirement by increasing repos to 5 because it was unable to immediately increase its deposits. By increasing the repos, the securities portfolio changed, with unencumbered securities decreasing to 5 and encumbered securities increasing to 5. In addition, the reserves also increased to 5. Consequently, the asset side of the balance sheet has increased from 100 to 105. Since the bank could not immediately change its loan-lending behavior, it changed its funding from the central bank to finance the additional financing needs of the hike in the reserve requirement. Therefore, the change in the repo part necessitates a change in the portfolio of securities. The bank decreased its unencumbered securities because they need to pledge some of their securities to be able to fund themselves from the central bank because they are using the securities as a guarantee, while they are funding themselves from the central bank. To fund themselves more from the central bank, they decrease their unencumbered securities and increase their income securities. In this study, the bank liquidity measure is calculated as the ratio of unencumbered government securities as a fraction of total liabilities. A bank with a higher liquidity ratio can handle changes in the reserve requirements by pledging their unencumbered government securities. The liquidity channel that the researchers are trying to understand is a hike in the reserve requirement, leading to more bank borrowing from the central bank

by pledging collateral, which declines the liquid assets ratio of the banking system and the banks would subsequently tighten their lending behavior.

Liquidity Channel: Reserve Requirements and Funding From CBRT

The mechanism works in this way. This graph shows short-term funding from the central bank as a share of total liabilities as a black line and the reserve requirements held by banks as a share of total liabilities as a dotted line. From the graph, it is clear that after the reserve requirement ratio was increased, bank funding from the central bank also increases. Banks increase their funding from the central bank after reserve requirements are increased.

Liquidity Channel: Liquid Assets, Reserve Requirements and New Loans

We also see that the securities held by the banks decreased after the reserve requirements have been increased. The dotted line shows reserve requirements as a share of total liabilities, the dashed line shows new loans as a share of total liabilities and the solid black line shows securities as a share of total liabilities. After the reserve requirements were increased, banks held fewer securities on their balance sheets, pledging them to collateral, and also decreased new loans.

Liquidity Channel

According to the liquidity channel theory, deposits and central bank borrowing are assumed to be imperfect substitutes but most studies in the literature assume they are perfect substitutes. The researchers assume deposits and central bank borrowing are imperfect substitutes because central bank borrowing/funding contains interest rate risk due to its short-term nature that is subject to changes in monetary policy. A tightening of local monetary policy would increase the funding cost, therefore, but if the bank holds deposits, the interest rate is predetermined and not as sensitive as funding from the central bank. The bulk of the existing literature not only

assumes perfect substitutability but considers the transmission mechanism of reserve requirements through the traditional cost channel, namely that an increase in the reserve requirements represents an additional tax on deposits. On the other hand, the liquidity channel takes into account the composition of the securities of the banks as an impact of changes in the reserve requirement.

Data

Bank-level data is used for the sample period from June 2010, when macroprudential policy tools were first used, until December 2015. The researchers use the ratio of required reserves maintained with the CBRT against banks' deposits and other selected liabilities. The paper looks at the impact of Turkish lira (TL) denominated loan rates, with the impact on commercial and consumer loan rates explored separately). The central bank primarily used the reserve requirements for TL-denominated liabilities for countercyclical purposes. The liquidity ratio was calculated from the total securities held by bank i as a fraction of its total TL liabilities.

Empirical Analysis

They ran several regressions at the bank level. The dependent variable is the interest rate on commercial or consumer loans of bank i in month t . The explanatory variables on the right-hand side are the lagged loan rate, monetary policy rate, central bank overnight lending rate or the average funding rate in month t . The central bank uses an interest rate corridor, so the average funding rate takes into account the differences in the funding cost in this interest rate corridor, while the CBRT overnight lending rate tends to be fixed at the upper bound of the interest rate corridor. Another explanatory variable is the monthly percentage change in the USD/TL exchange rate. The authors control for changes in the exchange rate. In order to test the liquidity channel, the authors add interactions of the bank liquidity ratio with the reserve requirement ratios. If a bank is more liquid, with a higher liquidity

ratio, it would be less affected by changes in the reserve requirement ratios. To understand this impact, the authors also added interactions between the bank liquidity ratio and the reserve requirement ratios.

Results

Regarding commercial loan rates, columns 1-4, the overnight lending rate has a positive impact on commercial loan rates. When there is an increase in the central bank's overnight lending rate, namely when there is an increase in the upper bound of the interest-rate corridor, commercial loan rates tend to increase. For the reserve requirement ratios, we see that when there is an increase in the reserve requirement ratios, commercial loan rates tend to increase for these types of banks. If there was perfect substitutability between central bank funding and deposits, the reserve requirements would not be significant, but we see a positive and significant coefficient for the reserve requirements in these regressions.

Liquidity Channel. In terms of the liquidity channel, the authors also interact the reserve requirement ratio with the liquidity ratio of the bank. We see in Column 3 that the reserve requirement still has a positive impact with a negative coefficient for the interaction variable. This means that for a given increase in the reserve requirement ratio, if a bank has a higher liquidity ratio, its increase in the lending rate will be less. If a bank has higher liquid assets, it will be more able to handle a short-term increase in the reserve requirement ratios. Therefore, the impact on its lending rates will be less. The final two columns show the impact on the consumer loan rate and deposit rate. For the consumer loan rate, the authors use the average funding rate because there is some research at the central bank that shows the average funding rate is more influential for consumer loan rate pricing. Therefore, the average funding route is used and similar results were found but the liquidity channel is insignificant for the consumer loan rate. For the deposit rate, however, the liquidity channel is significant with a negative coefficient for the deposit rate.

Conclusion

In conclusion, this study explores the interaction between reserve requirements, bank balance sheets and bank lending behavior in the context of Turkey. The authors show that the quantitative policies of the central bank affect lending behavior and the liquidity position of the banking system. The consequent shift in bank liquid assets is associated with a significant change in bank lending behavior. The study found that banks with a stronger liquidity position are less sensitive to changes in RR ratios. Overall, the results lend support to the view that reserve requirements have the potential to be an additional tool for the central banks in emerging market economies to relieve the policy trade-offs posed by the volatility of capital flows.

Foreign Currency Risk, Systemic Externalities and Real Effects¹⁵

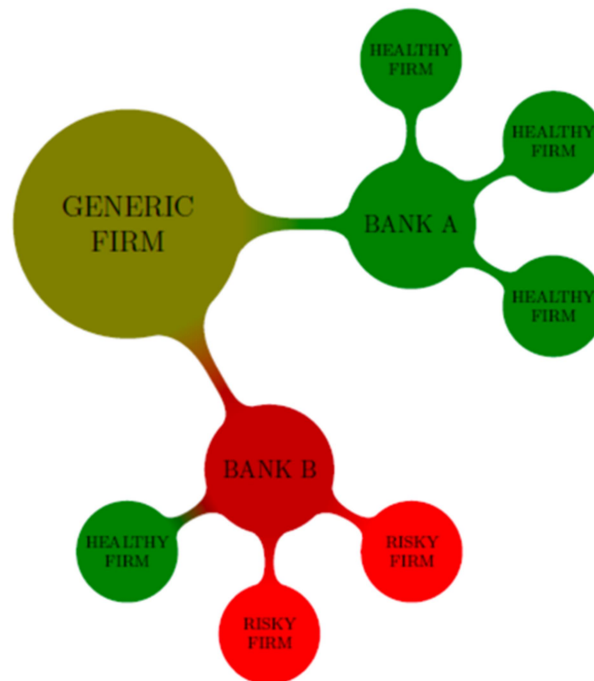
Motivation

Capital flows to emerging market economies may be beneficial by financing productive investment and fostering financial deepening but may also sow the seed of financial vulnerabilities in the event of a sudden reversal through financial integration, and especially after the Asian financial crisis, we see excessive foreign currency borrowing as well as real consequences in the economy. This paper tries to understand the systemic externalities due to foreign currency risk. We look at a period of sharp depreciation, after which hedged borrowers are unable to service their foreign currency debt. This will adversely impact the banks' capacity to lend, while simultaneously negatively impacting the firms. Even if they do not have any foreign currency liabilities, the banks will no longer be able to provide loans as their foreign currency borrowers are unable to repay the loan, thus undermining bank lending capacity. Risky foreign currency lending has received attention within policy

¹⁵ Fendoglu, et al. (forthcoming)

circles. Several chapters of the IMF Global Financial Stability Report are dedicated to risky foreign currency lending. The European Systemic Risk Board has also pointed out several risks associated with foreign currency lending, especially in Hungary where there is a huge amount of foreign currency lending. The research provides well identified, micro-level evidence for this mechanism.

Figure 10.17. Bank's Debt Structure



The figure above shows what the paper is trying to understand. The green nodes show healthy institutions and red nodes indicate unhealthy institutions. A risky foreign exchange borrower does not take into account that its risky borrowing may adversely affect other borrowers through banks after a sharp exchange rate depreciation and similarly, for a bank lending to risky firms. This provides a basis for the use of FX-related macroprudential policies.

Our Question

Do systemic externalities due to risky FX loans matter for credit supply dynamics after currency depreciation? The paper uses micro-level data for identification, taken from the Turkish Credit Registry and CBRT Company Accounts database. The paper takes an exogenous and sharp domestic currency depreciation period during the global financial crisis from October 2008-October 2009. We define a firm as a risky FX borrower if it has more short-term FX credit than exports. The short-term FX credit is a foreign currency liability. As a natural hedge, a firm might have foreign currency assets as exports but if it has more foreign currency liabilities, it will be more exposed to currency depreciation and the firm is said to be riskier. We calculate the weighted average exposure of each bank to risky FX borrowers because we see from the credit registry which firm is borrowing from which bank at which maturity and which amount. In this paper, the identification is a given firm borrowing from at least two banks with different ex-ante exposures to risky FX borrowers. Do credit supply dynamics differ across these banks? Banks with more exposure to riskier firms are cutting their loans more after currency depreciation and we are trying to look at differentiation in terms of bank exposure to riskier firms. We also looked for any binding effect at the firm level on bank credit supply because firms can switch between banks.

Data

We use Credit Registry data from Turkey, which contains extensive details on bank-firm loan-type level loan transactions. The sample period is from October 2008 to October 2009, encompassing 60,000 firms and 23 banks (excluding Islamic and development banks, which apply different lending structures). We matched the Credit Registry data with the Company Accounts Database using annual balance sheets and the income statements of a large sample of firms exceeding 10,000 for the period from January 2006 to December 2016. The coverage exceeds 96% of outstanding FX loans in October 2008. We controlled for the banks characteristics in our analysis

using the Supervisory Bank Database from the Banking Regulation and Supervision Agency as well as the monthly balance sheets and income statements of banks.

Definition: FX Risk

Firm risk is defined by how much a firm can meet its short-term FX bank credit by its exports. A higher value implies a higher risk firm. Bank exposure to risky FX borrowers is the weighted average of these ratios at the bank level. This means that if a bank is working predominantly with riskier firms, the bank would also be more exposed to the risk of a currency depreciation shock. We calculated bank exposure at the bank level by using the firms' riskiness. Banks that extend more credit to riskier firms are potentially more exposed to a currency depreciation shock. We calculate and measure the shocks ex ante. We will see the impact of a shock by using the ex-ante variation in the banks' exposure to riskier FX borrowers.

Interaction	
<i>Participant:</i>	How did you define the weight?
<i>Speaker:</i>	The weight is defined from the credit registry data, showing which firm is borrowing from which bank. For each firm, we calculate the weight in the bank's loan portfolio multiplied by the firm's riskiness to get a bank level of exposure to risky borrowers.

Empirical Model

How do banks adjust their supply of credit in response to sharp depreciation? Does exposure to risky FX borrowers matter? We ran a regression for our analysis. The dependent variables include the log change in outstanding credit from October 2008-October 2009. The explanatory variable is the exposure to riskier borrowers and we also added some other bank controls, such as non-core FX liabilities, tier-1 capital ratio, liquidity

ratio, size, NPL and ROA. If a firm is always borrowing from one type of bank, they may have a different lending relationship, so we controlled for that as well by adding the share of bank b 's credit in firm f 's total bank credit. As a dependent variable, we also look at lending behavior at the extensive margin. By extensive margin, I mean that the banks that are more exposed to riskier borrowers are giving new loans to new borrowers or new firms or are they terminating their existing relationship? We also look at the impact on this extensive margin behavior of the banks.

Banks working more with ex-ante risky FX borrowers reduce their credit supply more. The dependent variable in this table is the change in the amount of credit from a bank. The explanatory variable is the exposure to risky FX borrowers and the other bank controls. We add some controls one-by-one in each column and the most saturated control is in the last column (6). We see that for the estimations of all regressions, the coefficient of exposure to risky FX borrowers is negative, which means that if a bank is working with riskier firms, after currency depreciation, such a bank would cut their lending more to an average firm. Even if an average firm does not have any foreign currency loan, through the banking system they will have fewer loans due to the riskier foreign currency lending by the banks.

Ex-ante risky FX borrowers are more likely to default in the future. The banks are cutting their lending to average firms because the riskier firms are unable to pay back their loans. The dependent variable in this table shows the future default as an indicator variable. If a firm defaults on a loan within the next year, it receives a value of 1. No default gives a value of 0. We ran the dependent variables on the firm's characteristics. 'Firm FX Risk' means that the firm has an open FX position. We control for the firm size, age, net worth and exports. We see that if a firm has a higher open FX position, it would be more likely to default within the next year after a currency depreciation shock. Therefore, ex-ante risky FX borrowers are more likely to default in the future.

Banks working more with ex-ante risky FX borrowers have higher NPL later. For that reason, banks working with more ex-ante risky FX borrowers have a higher increase in their respective NPL ratios. The y-axis shows change in the bank NPL ratio and the x-axis shows bank exposure to risky FX borrowers. As a robustness check, we also use a different measure for exposure to risky FX borrowers. In the baseline case, we use the firms' short-term foreign liabilities as a foreign currency liability but for a robustness check, we use total foreign currency credit. For both cases, we see that if a bank is working more with risky firms, after a currency depreciation shock they show a higher increase in their respective NPL ratio.

Banks working more with ex-ante risky FX borrowers are more likely to terminate their relationship with existing clients. This table shows the results at the extensive margin for the amount of loans these banks are giving. The results demonstrate that banks working more with ex-ante risky FX borrowers are more likely to terminate their relationship with existing clients. We could not find any significant impact on the lead lending behavior of these types of banks.

The reduction in bank credit is binding (firm-level). Firm-level regressions showed that the reduction in bank credit is binding because the firms are unable to switch between banks. The declining credit, therefore, is binding at the firm level.

Conclusion

We found some robust evidence for systemic externalities through the banking system following an exchange rate depreciation shock. We saw a binding reduction in overall bank credit supply due to risky FX borrowers and binding financial constraints for firms. The firms are unable to switch from risky to less risky banks. A key insight is that an optimal policy design should pay attention to such externalities/spillovers. Ex-ante prudential policies should make borrowers/lenders internalise such externalities.

11. Reserve Bank of India Policy Mix

Anand Prakash and S.M. Lokare

Introduction

In the last couple of years, what are the issues that we have been grappling with? What are the policy trade-offs we are facing? This chapter will answer those questions focusing on growth versus inflation, amongst others, along with the interaction between monetary policy and the external sector, the challenges of liquidity management and the nonbanking sector, monetary policy versus fiscal policy as well as surplus transfer to the government. In terms of the special issue on policy mix, I have chosen asset quality because that has been a major issue in recent times in India. I will close with the outlook as well as the key risks I would like to flag going forward.

Like many other central banks, the Reserve Bank of India (RBI) issues currency, acts as a banker to the government and banks and manages foreign exchange as its core functions. The control of credit used to be an RBI function but that is no longer the case. In terms of the non-monetary functions, RBI collects a whole host of information and data on macroeconomic variables that is published on the official website. RBI is also responsible for the regulation and supervision of the banking industry as well as development and promotional activities, such as spreading the institutional reach of the financial network and promoting some social activities.

Issue 1: Growth vs. Inflation

Monetary Policy Framework: Recent Experience of Flexible Inflation Targeting (FIT)

The monetary policy framework in India has evolved over time. From the 1980s until the late 1990s, RBI applied a monetary targeting approach. After the late 1990s, we used a multiple indicators approach, under which there were basically two objectives: growth and inflation. With the progress of liberalization and globalization, however, financial stability emerged as the explicit objective of the central bank. Presently, what we have is the flexible inflation targeting framework, to which we shifted in 2016 through a legislative amendment. The current objective is to maintain price stability, while keeping in mind the objective of growth. RBI adopted CPI as a nominal anchor, with the target set at $4.0 \pm 2\%$. The interest rate path is set by the MPC, which has three external and three internal members for a total of six members. With this framework, we introduced many changes to the liquidity management framework. We did away with some refinancing schemes. We brought down the statutory liquidity ratio. Then, we implemented the bimonthly policy review cycle and biannual monetary policy report. Throughout its evolution, there has been a continuous rebalancing of weights between the different objectives of monetary policy. More so between growth and inflation. Although we have the primary objective of maintaining price stability, we must also keep in mind the objective of growth. There is always a rebalancing issue.

Why Did RBI Shift To FIT?

Since we are the latest entrant in the club of IT countries, I would like to share why RBI shifted to FIT. In India, there was a long debate about how the inflation targeting framework was not suitable for India's case, precisely because we did not have a single price index for the country. We had four different price indexes because of the vastness of the country and diversity of regions. Second, there was an administered prices mechanism. Many of the agricultural commodities were regulated in terms of prices. This meant that the Government of India announces the minimum support prices of agricultural commodities. Under the IT framework, this would not do. Third,

the high share of food in the consumption basket, which is beyond the remit of the central bank's control. Fourth, imperfect markets. This prompted us to shift towards FIT. In terms of India's growth story, between 2003-2004 and 2007-2008, India encountered its highest growth phase, reaching nearly 9%. At the same time, the country went through a phase of low inflation of less than 5%. Post crisis, however, signs of stagflation suddenly appeared, namely low growth coexisting with high inflation. Consequently, RBI began to wonder what was wrong with its policy framework. It was precisely during Raghuram Rajan's time that we set up a committee which deliberated extensively and recommended FIT. At that time, in 2011, India also launched a single price index, which provided further grounds for the shift towards FIT.

Figure 11.1. India: GDP

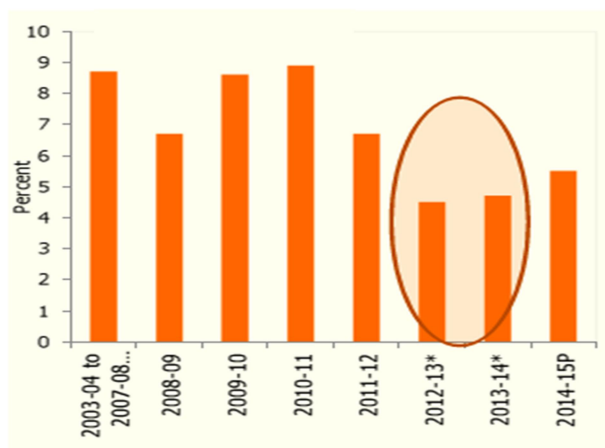
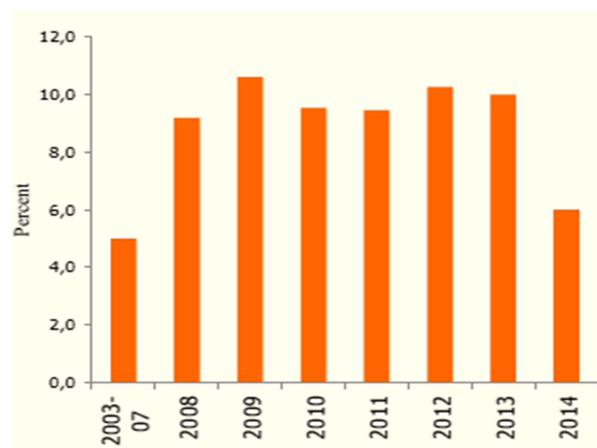


Figure 11.2. India: Inflation



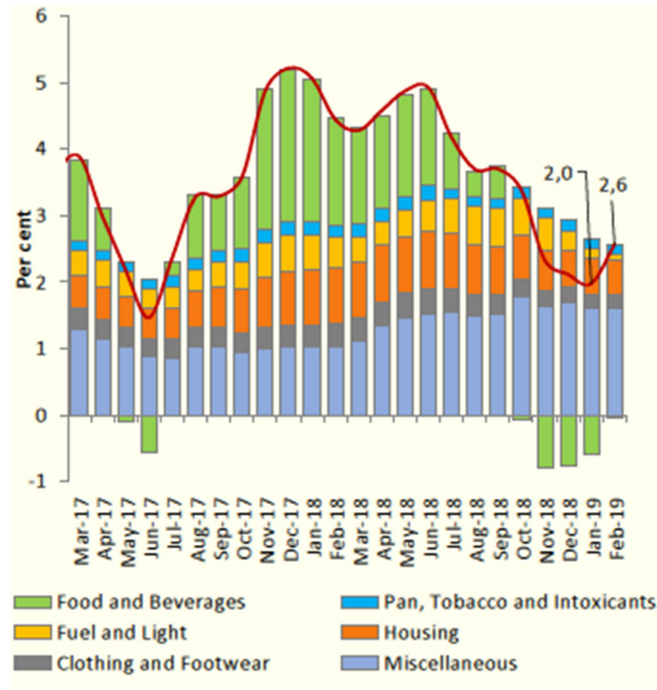
Source: RBI

Outcomes under FIT

We adopted FIT in 2016 and inflation has continuously been brought down since then from close to 11% to just 2.5% now, while India has maintained growth at 7%. This has greatly enhanced the effectiveness and credibility of our monetary policy. This has also enhanced the government's credibility because the government has committed to this target and it is part

of this agreement. Therefore, this indicates government commitment to fiscal prudence and reducing the burden on monetary policy. Food has a high contribution to headline CPI inflation, followed by fuel and light.

Figure 11.3. India: Contribution to Headline CPI Inflation



Source: RBI

Monetary Policy Operating Procedure

This is the corridor we have in India. It is just 50 basis points. We have a single policy instrument, namely the repo rate and our operating target is the weighted average core money rate (WACR). Our liquidity management operations ensure that the core money rate remains closely aligned with the policy rate. Volatility is restricted by the upper and lower bounds. The upper bound is defined by the Marginal Standing Facility (MSF) and the lower bound is defined by the reverse repo rate (floor), which is the reverse repo window through which the Reserve Bank accepts surplus liquidity from the banks. That is always 25 basis points below the policy rate. The Marginal Standing Facility is the facility available for the banks to avail central bank

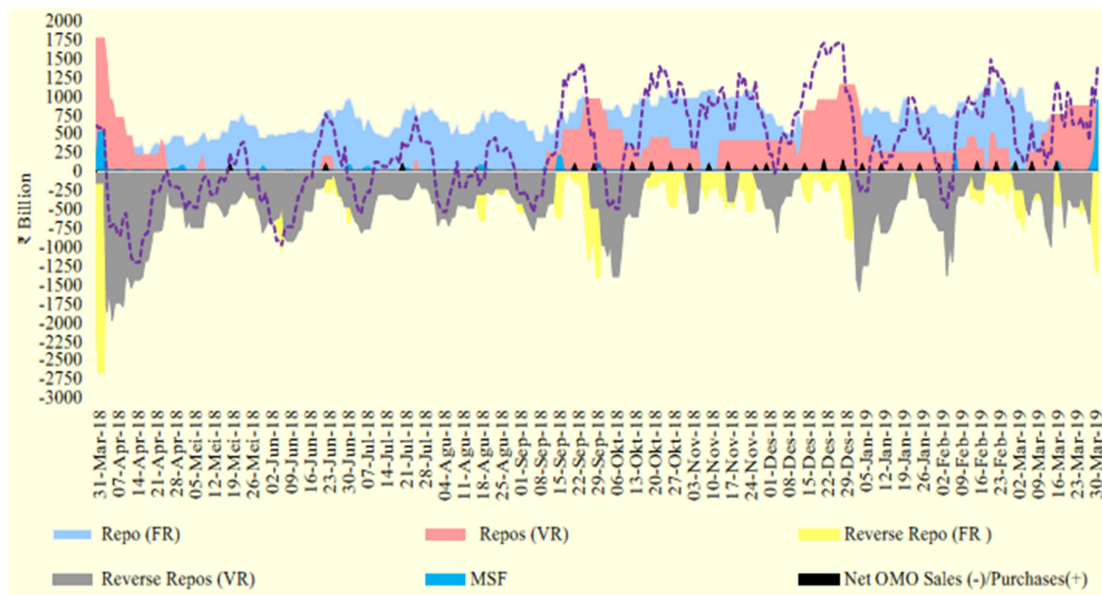
liquidity even as normal operations are taking place. That is 25 basis points above the policy rate.

Issue II: Interaction between Monetary Policy and External Sector

Liquidity Management

This shows how we have conducted liquidity management. We have many instruments at our command, such as fixed repo, fixed reverse repo and marginal standing facility to manage the frictional liquidity. To manage the structural liquidity, which is long-tender durable liquidity, we have open market operations and the Market Stabilization Scheme (MSS). Just to be clear, we do not use our policy corridor to manage capital flows. It is entirely an instrument of monetary policy. During a phase of high capital flows, however, we have the Market Stabilization Scheme. This is a scheme under which a separate account is opened with the Government of India and government securities are sold or bought and credited to the remaining balance of that account. This means that the Reserve Bank is not bearing the cost of the sterilization operations.

Figure 11.4. India: Monetary Instrument



Source: RBI

Interaction	
Participant:	Do you publish the bandwidth to the public?
Speaker:	Yes, it is published in every monetary policy report. It is 50bps; 25bps above and 25bps below. We recently augmented our liquidity management toolkit with long-term forex swaps. To give long-tenor liquidity to the market participants, we have entered into forex swaps with the banks for three years. This means that banks will come and give dollars to the Reserve Bank and the Reserve Bank will give rupee liquidity to them. When the banks return to take the dollars, they must pay a swap premium and take back their dollars. We also have a 14-day term repo at a variable rate. Liquidity is provided for 14 days at a variable rate. We also use a reverse repo of varying tenors for fine-tuning purposes.

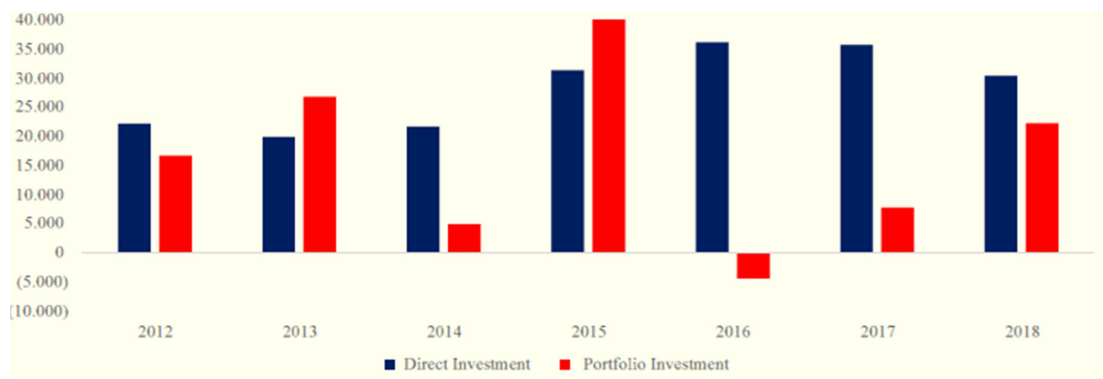
Before I turn to how our conduct of liquidity management was completed by the external sector, that is capital inflows, let me just tell you briefly about the Southeast Asian crisis. The biggest reason, we believe, for the Southeast Asian crisis was free capital account convertibility. At that time, the IMF was freely advocating capital account convertibility. Most of the Southeast Asian countries rapidly opened up their capital accounts. Suddenly, there were huge capital inflows but, in the process, the capital inflows were short-term in nature, which were susceptible to reversals. When a reversal happened, things came crashing down. In India, however, we went through the capital account liberalization process very cautiously. In India, it was not an event but more of a process and the process was sequenced by macroeconomic fundamentals and the sustainability of the balance of

payments. Even today, India's current account is still not fully convertible. There are moderate controls but mostly it is free. FDI is free in most sectors, barring six sectors, and there are some interest rate ceilings on external commercial borrowings. We also have some sectoral caps on foreign institutional investment in government bonds and corporate bonds.

Direct Investment and Portfolio Investment

In 2018, which also includes January 2019, the FDI India received was to the extent of USD29 billion, which was higher than last year if you take into account the latest month. In terms of portfolio investment, however, capital outflows were recorded from India in 2018. This was because of concerns regarding global growth at that time, along with trade war concerns, geopolitical tensions and the rising oil price. Sudden risk-on sentiment made the capital flows go back to their home countries. In 2019, positive portfolio flows returned to India due to the dovish monetary policy stance adopted amongst central banks in advanced economies and improving sentiment. What was the impact of the capital outflows? How did they complicate liquidity management?

Figure 11.5. India: Direct and Portfolio Investment
(USD Million)

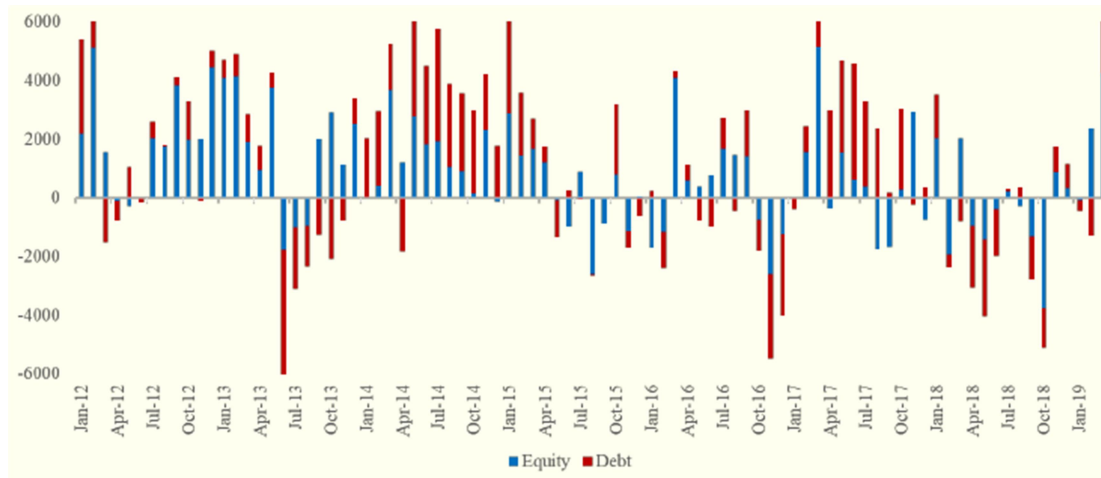


Source: RBI

Equity and Debt Flows

Among the FDI flows, equity was dominant, which is of a stable nature.

Figure 11.6. India: Equity and Debt Flows
(USD Million)



Source: RBI

Exchange Rate Movement

The Indian rupee came under depreciatory pressures in 2018. When the Indian rupee came under pressure, the Reserve Bank had to intervene in the foreign exchange market. Although the Reserve Bank does not control the exchange rate nor does it have any target for the exchange rate, it does intervene to bring orderly conditions in the market. The Reserve Bank had to give dollars to the market but, at the same time, this operation had to be counterbalanced by providing the liquidity to the market to avoid pressure on interest rates. These operations had to be conducted cautiously and in a calibrated way so that each would not impact the others. Since 2019, the rupee has appreciated by around 5%, second only to the Turkish lira. Incidentally, the Indonesian rupiah has been trending on a similar path, which is quite interesting. These are all the current account deficit countries and you can see the surplus countries above.

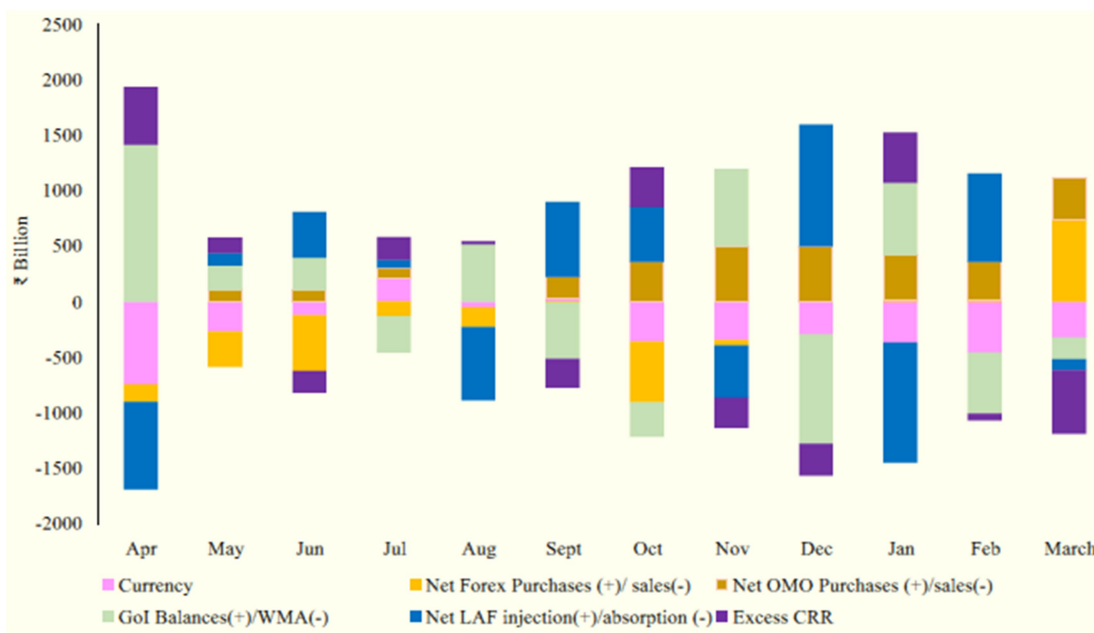
Interaction

<i>Participant:</i>	Do you have any target for exchange rate?
<i>Speaker:</i>	We do not have any target for the exchange rate but we do try to minimize the volatility in the foreign exchange market. We try to contain the volatility. If too much volatility is there, it creates problems for the trading community and all sorts of other problems in the economy. Therefore, we try to contain that volatility. There is no target for the volatility. It is a judgment call.

Drivers of Liquidity Management

Due to the operations and controls, the main drivers of liquidity management in 2018 and 2019 were foreign exchange operations and domestic currency in circulation. In the first half, it was foreign exchange operations and in the second half, it was currency in circulation. These were the structural drivers but the frictional liquidity was driven by government spending.

Figure 11.7. India: Drivers of Liquidity Management



Source: RBI

Issue III: Liquidity Management vs. Nonbanking Sector

Currently in India, we have more than 10,000 nonbanking financial institutions registered with the Reserve Bank of India. Although they are not very systemically important, they are widespread across the breadth of the country. The exposure to sensitive sectors is low, however. Compared to several commercial banks, nonbanking sector exposure is just around 7%. Recently, some nonbanking financial institutions came under transient pressure due to several issues. Intense pressure was building on the central bank and through the government, demanding liquidity from the central bank, asking for a special window. Based on the quality of assets, the Reserve Bank did not give them any liquidity window. What they did instead was to provide enough liquidity to the other banks so they could on-lend to the nonbanking sector. RBI did relax some norms for the NBFC sector. Earlier, they were given 100% risk weights whenever the banks were lending, but now the banks are given the freedom to take their own ratings as given by the credit rating agencies and lend to the nonbanking financial institutions. These are the challenges that we were facing from the different sectors, from the government and from the external sector in the conduct of liquidity management.

Issue IV: Monetary Policy vs. Fiscal Policy

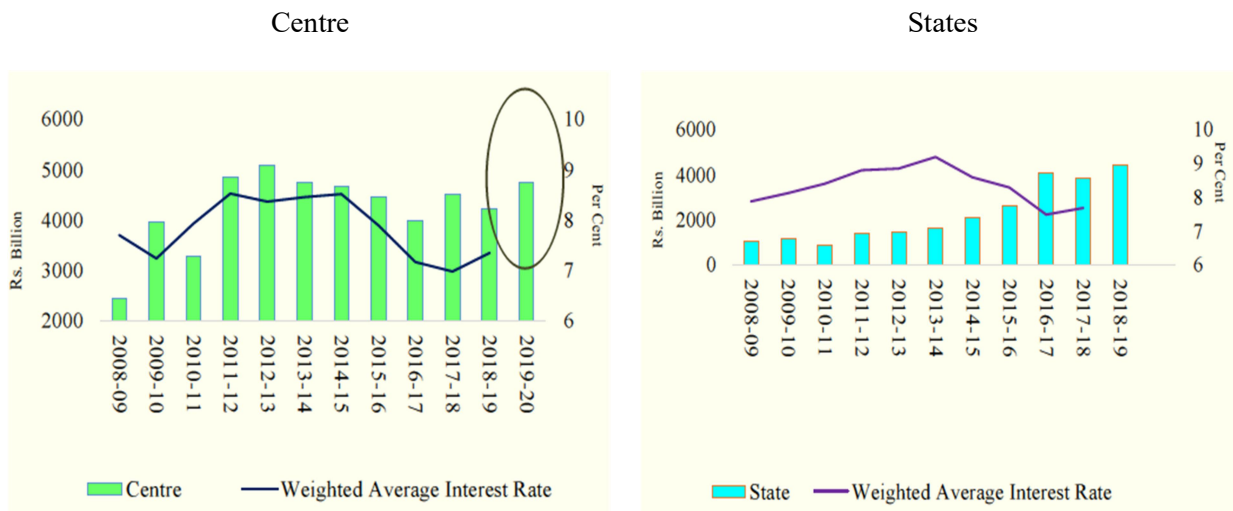
I would like to address a few things about central bank independence. With the recent adoption of the flexible inflation targeting framework, we have the MPC, which sets the interest rate. We have instrument independence. The Reserve Bank can use any instrument at its command and at its will. The interest rate is set by an independent committee. In Indonesia, the Ministry of Finance first sets the overall macroeconomic policy and the central bank works within that. It is the same case in India. I can recall one of our former governor's statements, "The Reserve Bank is independent within government." It is totally independent in its operations but it has to be

subservient to the broad national objectives. Parliament and the government are answerable to the public, so we are subjected to that public mandate.

Government Market Borrowing

In India, the central bank manages the domestic debt of both the central government and the provincial governments. It manages on behalf of the government by raising resources from the market. In recent years, there has been a huge government borrowing program announced by the government. It is the same case with the state governments. Consequently, the huge government borrowing program and the expected slippage in the fiscal target meant the yield remain high in 2019.

Figure 11.8. India: Government Market Borrowings



Source: RBI

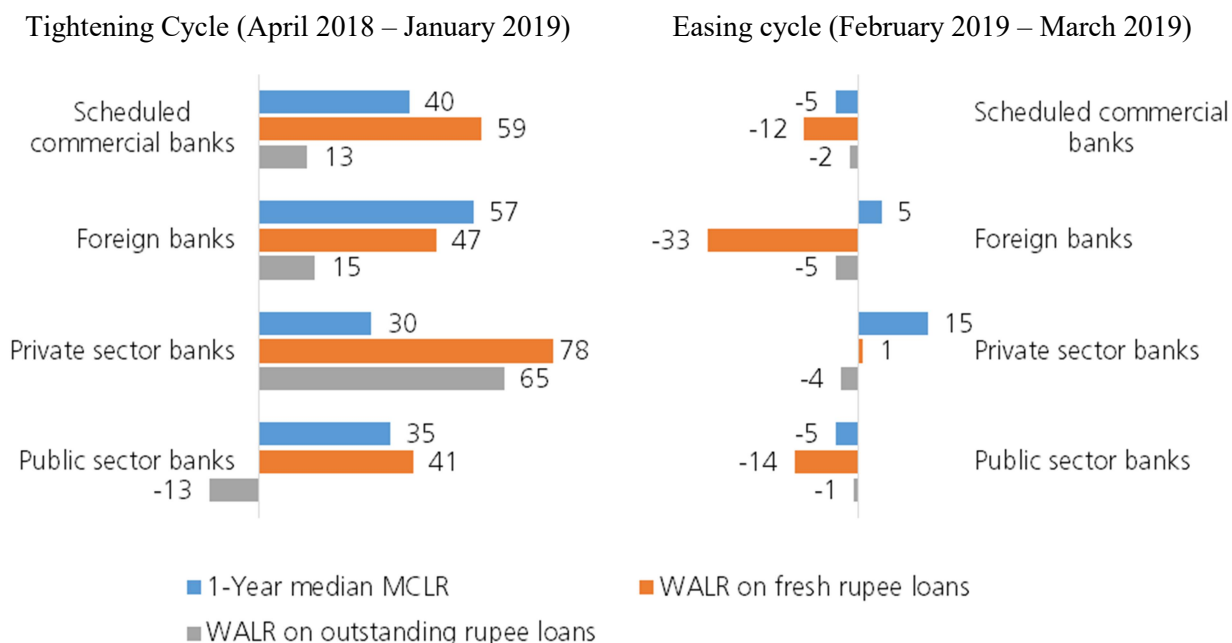
Transmission

In 2018, yield also remained high but because of other things. There were concerns at that time regarding the fiscal deficit, oil prices and geopolitical tensions but in 2019, yield continues to remain high. What did this do to our transmission? Here, we had a monetary policy tightening cycle up to 2019 yet since February 2019 we have followed an easing cycle. Here,

the Reserve Bank of India reduced its policy rate by 25 basis points but despite the reduction in the policy rate, yield had continued to remain high because of the large government borrowing program. As a result, transmission to bank lending rates, namely the credit market, was very poor and delayed. On fresh rupee loans, the decline in interest rates was just 12% and on outstanding loans, it was just 2%. As a corollary of the government's borrowing program, monetary policy transmission was delayed. It was also clouded by some asset quality concerns but it was largely because of the government borrowing program. As we said, there has to be proper coordination between monetary policy and fiscal policy in India. Largely, it is conducted in coordination and they complement each other. There are times when they go against each other in terms of reducing their effectiveness.

Figure 11.9. India: Monetary Tightening and Easing

(on lending rates)



Source: RBI

Issue V: Surplus Transfer to the Government

In the recent past, there has been a debate in India. How much surplus transfer should go to the Government of India? The government is asking for more surplus transfer but the central bank is arguing that it needs enough capital at its disposal. That is the issue we are confronted with now. Why does the central bank need capital?

Relevance of Capital for Central Banks

Many central banks have made losses in the past. Indonesia makes an appearance on that list too. In terms of central bank independence, recapitalization by the government may be at the cost of independence. In addition, capital is required to preserve the ability of central banks to conduct public policies that may lead to losses. The last factor is market confidence. The markets should have confidence in the central bank's monetary/exchange rate actions. It is because of these reasons that the central bank has been saying it should have enough provisions. Of course, by statute, the central bank is required to transfer the profits after making provisions for bad and doubtful assets, depreciation and contribution to staff.

After making provisions for doubtful assets plus depreciation plus contribution to staff and subordination funds, whatever remains is supposed to be transferred to the Government of India by statute. Nevertheless, this has been contended by the Reserve Bank of India, which feels it needs contingency reserves and other reserves because the central bank may incur losses due to undertaking risky operations. We are investing in the government securities of other countries and the bonds of international institutions. Between this debates, recently an expert committee has been appointed by the Government and Reserve Bank of India to examine the circumstances under which the central bank would like to hold more provisions and how much transfer it should make to the government. The jury is still out on this issue, but we are confronted with it.

Special Issue: Asset Quality of Indian Banking System

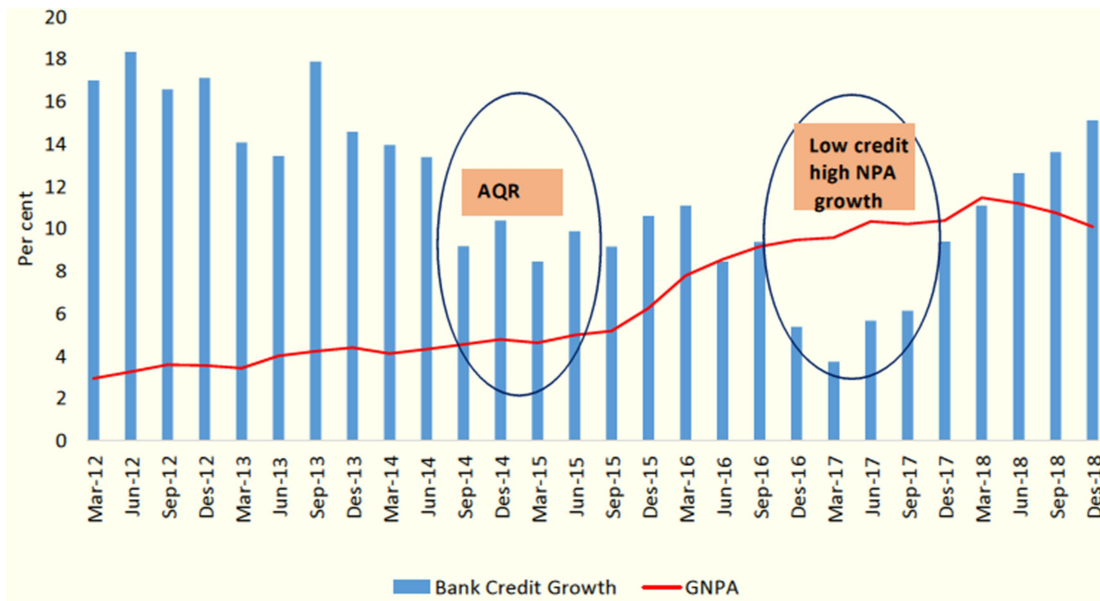
This has been a matter of great concern for us in recent times. Since post-crisis, banks in most countries, including advanced and developing economies, have experienced asset quality impairment. In other words, asset quality has deteriorated. In India, however, it was largely maintained with asset quality largely intact. Since 2012, however, the decline suddenly appeared. Asset quality has started to deteriorate. The situation worsened because before 2008, during the high-growth phase, we had a period of high credit growth (credit boom). During that credit boom period, bankers tended to relax their lending standards, leading to excessive lending. That started showing up in the latter phase and what happened in India around 2012.

Asset Quality Review (AQR)

The Reserve Bank then undertook a major exercise, an asset quality review. Under this review, the Reserve Bank supervised or closely inspected some 36 major banks based on the offsite data available. The Review examined the status of large borrower accounts through analysis of offsite data from the central repository for information on large credits (CRILC) and other data. It revealed significant divergence between the reported levels of impairment and actual positions, namely much higher than the reported levels. The banks had reported one thing, but our rigorous analysis revealed significant divergence between what we found and what was reported.

After the AQR in September 2015, asset quality has deteriorated. GNPA went up from 4% to 8% and 10% in more recent times. When the asset quality started deteriorating, credit growth dropped sharply from around 11% to just 4%. In recent times, however, efforts to resolve the asset quality problems and clean up the balance sheets have restored credit growth. The right-hand graph shows the provision coverage ratio maintained by the banking industry.

Figure 11.10. India: NPAs and Bank Credit



Source: RBI

Regulatory Steps

These are the regulatory steps we took to resolve the asset quality problems. The gist of the regulatory steps is to provide the banks's loan restructuring options and for the banks to come up with a Prompt Corrective Action plan to turn around the distressed entities. Third, converting the unsustainable debt into equity. The regulatory steps are as follows:

Framework on Revitalizing Stressed Assets in the Economy: Early recognition of financial distress, prompt steps for resolution and fair recovery for lenders

- Central Repository of Information on Large Credits (CRILC) – Revision in Reporting
- Flexible Structuring of Long-Term Project Loans
- Strategic Debt Restructuring Scheme
- Scheme for Sustainable Structuring of Stressed Assets (S4A)
- Prompt Corrective Action
- The Insolvency and Bankruptcy Code, 2016

Restructuring

Providing a longer amortization period for long-term loans and periodic refinancing, for instance, in the case of unstructured loans. Due to the long gestation period, we provided a long amortization period of, say, 24 years, along with periodic refinancing every 3-5 years.

Prompt Corrective Action (PCA)

This was the most debated scheme in India and has been called into question by many lobbying circles. Under this prompt corrective action plan, the Reserve Bank monitors key indicators of commercial banks, including capital, asset quality and profitability. Any breach of risk thresholds, in terms of capital, asset quality and profitability, invokes the PCA framework. Once the PCA framework has been invoked, other restrictions are imposed on the bank. They would not be able to undertake many operations. A bank will be placed under the PCA framework based on the supervisory assessment made by the RBI. Leverage is also monitored and the key indicators tracked include CRAR/Common Equity Tier I ratio, Net NPA ratio and Return on Assets. The central bank has placed 11 commercial banks under the PCA framework. There were increasing calls from lobbyists that the norms should be relaxed. The government's emphasis is always on increasing credit, but the central bank's emphasis is always on financial stability. It is like boosting credit without regulatory forbearance, with implications on financial stability. This is the ever-present conflict between short-term vs. long-term costs and benefits. The Reserve Bank was aiming for financial stability and regulatory tightening, whereas the government and banking community were asking for forbearance.

Central Repository of Information on Large Credits (CRILC)

The essential objective of CRILC is to enable banks to take informed credit decisions and early recognition of asset quality problems. Meanwhile,

CRILC is expected to play a pivotal role in activating and coordinating the mechanism to manage stressed assets. The repository only deals with large credits. It provides all the data in a consolidated form of bank exposure to different borrowers. Furthermore, we have online modules for dissemination of data on non-cooperative borrowers, facility-wise borrower exposure details, select borrowers' asset classification and fraud classified borrowers.

Functionalities in CRILC

We categorize different special mention accounts (SMA) based on these classifications:

- SMA-0: Not overdue for more than 30 days but with incipient signs of stress
- SMA-1: Overdue between 31-60 days
- SMA-2: Overdue between 61-90 days

Once an account falls into the second category, it immediately alerts all the banks to be careful about these borrowers. No other bank should be lending to them. Corrective actions are immediately taken.

The Insolvency and Bankruptcy Code 2016

This is another major bank tool we are using in India. For a long time, India did not have any legally enforceable resolution mechanism. In 2016, however, we promulgated the Insolvency and Bankruptcy Code that empowers creditors to deal with the troubled entity's assets. In fact, creditors or banks can now take over the assets of borrowers and they can come up with a resolution plan. This has turned out to be quite an encouraging experience so far. According to the data, this resolution mechanism has been able to provide resolution plans to some of the large corporate debtors. The cases where liquidation has been required are higher than the cases of resolution.

Outlook: India in the World Economy

India continues to be one of or *the* fastest growing economies in the world. It has been there for the last 10 years. Presently, India is going through a period of demographic transition. The portion of the younger population is high in India. If we capitalize on that demographic dividend in terms of developing the infrastructure and imparting the required training and skillsets, India has tremendous potential. India has a sustainable current account deficit of 2.5% of GDP and a relatively moderate fiscal deficit of 3.5%. With such sound macroeconomic fundamentals, India has promising prospects going ahead but, as is the case with other countries, there are risks to us as well.

Interaction	
Participant:	Growth in India has increased compared with conditions last year. In other countries, however, GDP growth is lower. What is the source of the growth in India this year?
Speaker:	Growth this year has basically been driven by domestic investment. Growth in India is primarily consumption led. There is plenty of untapped demand in India so the growth story is always dominated by domestic consumption. In recent years, however, the investment cycle has fortunately turned around and growth is currently led by investment.

Key Risks Going Forward and Outlook

- Pace of US Fed's rate hikes and balance sheet unwinding, as well as the spill-over effects;
- Financial market volatility, risk-on and risk-off sentiment;
- Trade war concerns between the United States and China;

- Crude Oil Prices – Reversal of trend. So far we have been lucky but who knows when the tide will turn;
- Geopolitical Risks;
- Uncertainty over global growth conditions;
- Uncertainty over Southwest monsoon. India is primarily an agricultural country. The contribution of agriculture to GDP has come down to around 18%. Agriculture is basically driven by the monsoon. It is at the vagaries of the monsoon. That continues to be our concern and the challenge. In our CPI basket, we have a high share of food. If the monsoon turns bad, food prices go up and the inflation target will go;
- High food inflation. This is also a threat for Indonesia; and
- Likely slippage in fiscal deficit target.

Interaction	
<i>Participant:</i>	There is high demand for loans for the government. The government is demanding too much financing. Fiscal policy is now demand high to finance numerous projects. How does the central bank deal with that? The fiscal budget is very high to finance projects and how does the RBI deal with that? I checked and it seems the biggest problem in India is on the fiscal side. Interest is very high, growth is low and inflation is very high. India is facing something. How about NPL? A recent report has shown an increase in bad loans, which is also an economic indicator.
<i>Speaker:</i>	They have their own financing sources. They are raising their own resources from the market. At the same time, the government is also mobilizing resources through the 'Made in India' program. Our current prime minister is

very dynamic and has come up with many schemes to mobilize capital from various sources. Although I mentioned the huge borrowing program, our domestic debt is at a very low level compared to other countries. Non-performing loans are a major problem in India, but they have just started coming down recently because of the regulatory steps we have undertaken. We now have some harsh draconian legislation in place, namely that the banks are fully entitled to acquire your assets the moment you default. Earlier, that was not the case, but the banks have now been given full power through a legislated mandate. The Indian Government is trying with the UK Government to get Vijay Mallya extradited to India because he has defaulted on many things. Recent legislation has given these powers. I am just giving an example, this is not to name anybody.

Participant:

How is the yield curve of your government bonds? For infrastructure development, we need longer-term government bonds, right? How do you define financial system stability? Do you have a central committee? Is RBI still lender of last resort?

Speaker:

In 2018, it had become quite steep but now it has come down a bit because of other domestic factors. In India, it is inflation. Inflation is quite low now; the current account deficit is low and monetary policy is in easing mode so the yield curve is flatter. You are right though, in 2018 the yield curve was quite steep because of global factors, such as crude oil prices, trade war concerns, geopolitical tensions and the US Federal Reserve increased its policy rate. We have a Financial Stability and Development

	<p>Council in India -in Indonesia, this is shared with the finance minister- but RBI has an important role to play there because we are regulating and supervising the banking system. RBI is still the lender of last resort. There are other stakeholders, including the insurance regulator and stock market regulator, but the Reserve Bank has a major say in financial stability because financial intermediation mainly (80%) takes place in India through the banks, which are regulated and supervised by the Reserve Bank. Actually, the Reserve Bank has more say in terms of financial stability.</p>
<i>Participant:</i>	<p>Have you started implementation of International Financial Reporting Standards (IFRS)? For us in Oman, after IFRS implementation, we had an issue of increasing non-performing loans. Is it the same in India due to the changes in the accounting and reporting part? Which sectors in India are expanding currently? Which sector is doing better? If it is the services sector, it is an issue because although it helps India create more jobs it is not as good as manufacturing because manufacturing can give you more FX growth. The services sector provides more jobs.</p>
<i>Speaker:</i>	<p>India will begin IFRS implementation shortly. Banks have been given the models and we expect the NPL to show up higher. There are many accounting problems. We are first preparing the banks for this new reporting format because they are not used to it. In India, the services sector is currently expanding. You are saying that the services sector can give notional growth but manufacturing is what is really going to add to your national production. India is</p>

	<p>an IT hub, including electronics and software. Having said that, manufacturing is not doing badly either. Manufacturing is doing well but not to the extent of services.</p>
<i>Participant:</i>	<p>I have a question about the differentiated risk weights. How do you determine the sensitive sectors? Which variables are you following for these sectors to determine that they are sensitive?</p>
<i>Speaker:</i>	<p>The Reserve Bank has categorized some sectors going by the volatility in their asset prices, especially commodities, commercial real estate and housing. These are the sensitive sectors in India.</p>
<i>Participant:</i>	<p>Regarding the interaction between macroprudential and monetary policies. You said there is some sort of coordination between the two policies, I was wondering whether it is coincidental coordination? If it is calibrated coordination, how was it calibrated? Was it by virtue of the governor deciding both or is there some sort of committee? Are all macroprudential policies taken by the FSDC now?</p>
<i>Speaker:</i>	<p>It was calibrated coordination. The coordination that I mentioned earlier happened before the Financial Stability and Development Council was established. Financial system stability was only looked at by the central bank. At that time, coordination was easy because the policies were taken by the Reserve Bank. Even now, coordination is still being done because the governor of RBI is always present at major policy decisions and whatever policy decisions are taken by the FSDC, they are done in close consultation</p>

	with the governor. All macroprudential policies are taken by the FSDC now but the Reserve Bank has a major say because macroprudential policies mean you have to apply regulations on banks and the central bank is responsible for regulating the banks. It is the central bank that applies the ratios. The announcement is made by the FSDC but the regulations are applied by the central bank, which is done in close coordination. It is the same case in Malaysia.
<i>Participant:</i>	What is the average capital adequacy ratio of banks in India? How are the banks doing in terms of capitalization as well as short and long-term liquidity?
<i>Speaker:</i>	The minimum CAR prescribed by Basel is 8% but in India it is 9%. Nevertheless, banks in India tend to hover around 11%. As far as the liquidity coverage ratio is concerned, the one thing that really came in handy for the Reserve Bank was the statutory liquidity ratio. That may be unique to India. As per that ratio, all the banks had to necessarily invest in government securities, which made that ratio. It used to be 30% but now it has been reduced to 19.5% of net demand of total liabilities of banks. Now banks are investing in government securities in the statutory liquidity ratio, yet to meet the LCR requirements, the Reserve Bank has given them the concession to make use of that ratio, up to 11%, to meet the LCR requirements because it is high-quality collateral/liquid assets.
<i>Participant:</i>	By giving emergency liquidity assistance to banks, does the Reserve Bank of India have a limit or threshold on the level of risk for the bank that is going to be given the ELA? Are there certain requirements before giving the

	emergency liquidity assistance to the banks?
<i>Speaker:</i>	<p>We do not have any such requirements. On a day-to-day basis, we have a 1% limit in terms of the total liabilities of the banking system. 25% is provided under fixed rate auctions and the remaining 75% is provided under variable rate auctions. During the crisis, although India was not directly impacted by the global financial crisis, the country was impacted by indirect effects and knock-on effects, which put the banks under liquidity pressure. Consequently, the Reserve Bank opened up special windows for them for additional liquidity with no such limits because we know their financials. The banks are well regulated and supervised by the Reserve Bank of India so there is no question of putting any limits on them because all of their investments are with us.</p>
<i>Participant:</i>	<p>India has quite a high current account deficit. Do you have any plans to reduce the deficit?</p>
<i>Speaker:</i>	<p>Last year it was 1.8% but because of the capital outflows and high trade deficit, this year it has gone to 2.6%. The empirical studies in India have shown that a sustainable threshold is around 2.5%. Consequently, the intention is always to bring the current account deficit down. For emerging countries like India, however, it is better to have some deficit than to have a negative interest rate policy.</p>
<i>Participant:</i>	<p>India has increased and cut its policy rate within the last year. Have you observed any asymmetry in the transmission of monetary policy given the changing direction of monetary policy? Are banks prone to increasing their rates when the policy rate is increased but</p>

	then reluctant to reduce rates the other way? How do you convince foreign banks to lower their rates?
<i>Speaker:</i>	Like it happens with all central banks, during a tightening phase, the banks are quick to respond. During an easing phase, however, they are quite reluctant. Once they have raised the rates, the downward stickiness is always there. The Governor of the Reserve Bank and the Minister of Finance try to persuade them at the various meetings. They inform the banks that they must pass the rate cuts onto the customer. Bank managers always have their own excuses, such as deteriorating asset quality or higher transaction costs. Foreign banks also see that this is a competitive world, if they want to be in the market, they have to go with the tide.

Macroprudential Regulations

India started using macroprudential regulations in 2004. In fact, RBI was a pioneer and one of the first central banks to use macroprudential tools, which became more popular after the crisis. The measures RBI has include countercyclical provisioning, loan-to-asset value ratios and risk weights, particularly on housing and commercial real estate. This has been done in close coordination with monetary policy. Between 2004 and 2008, for instance, monetary policy was in tightening mode, and because that was a high growth and high credit period, the provisioning norms and countercyclical norms were also tightened. Monetary policy was tightened by increasing the policy rate by 300 basis points. At the same time, the provisioning norms were increased by 175bps and 25bps. From 2008-2009, monetary policy entered an easing phase and the macroprudential policy was also loosened. They were working in close coordination and as far as the effectiveness of these policies is concerned, a recent empirical study in the

RBI showed that these risk weights and countercyclical provisioning norms were effective at containing the credit growth. They negatively affected credit growth with a one-year lag. There is an asymmetric impact, however, in terms of the macroprudential regulations on different credit cycles for different business cycles. They are more effective in terms of containing credit growth, this means that they are unable to stimulate credit growth when it is low. This means, the macroprudential measures are effective during an upward cycle but ineffective during a downward cycle.

Interaction	
<i>Participant:</i>	What is your instrument for the interest-rate policy? Is it the repo rate?
<i>Speaker:</i>	The repo rate is the single policy instrument.

CASE STUDY ON CENTRAL BANK POLICY MIX

12. Case Development

Solikin M. Juhro

Learning Objectives

The case study attempt to examine the existence of linkages between monetary and financial stability, including: (i) the interaction among macro variables (real sector, monetary sector and financial sector) and between two different policy objectives (e.g. monetary stability and financial stability); (ii) the source of pressures (shocks) and its implication on the linkage between monetary and financial stability. It also seek to analyze the policy strategy in mitigating the risks of macroeconomic imbalances amidst high global economic uncertainties, such as during episodes of capital inflows and outflows, as well as to understand the integration between monetary and financial system stability frameworks and its possible implication on the change in central bank mandate.

Target Audience

Staff of central banks and monetary authorities with at least 5 years (significant) working experience on formulating/implementing monetary policy, macroeconomics, financial stability or other related areas.

Key Issues

- a. The nexus between monetary and financial stability; whether they are complements or substitutes.
- b. Source of pressures affecting the linkage between monetary and financial stability, as well as the work of monetary policy transmission mechanism
- c. Policy strategy to align the achievement of monetary and financial system stability objectives (e.g. policy mix)

Case Description

- a. The case is about the examination of some policy perspectives on the linkages between monetary and financial stability, including its dynamic interaction, source of pressures, policy strategy, and institutional implication.
- b. Participants are requested to explore feasibility to implement some policy instruments to mitigate the risks of macroeconomic imbalances, using the standard macroeconomic model which is operated using MS Excel.
- c. Participants will be given advanced readings, content/scope/structure of the case study, and leverage to accomplish the case exercises within the allowed time.
- d. Policy exercises and discussion on the answers given by participants during presentations

Identification of the Case

Case study is the combination of factual and fictional studies

- a. Factual experience of a case of Indonesian economy: economic developments, challenges, and policy responses (Timeline: 2000 – 2012)
- a. Factual and fictional narration of some macroeconomic challenges (external shocks), possible policy responses, and possible economic outcomes (Timeline: 2013)
- b. Associated with point (b), there are two conditions encountered as the impact of external shocks (in this case the dynamics of capital flows). First, normal condition (without feedback loops), a condition with a normal surge of capital inflows, which is in accordance with the latest trends. In this condition, it is assumed that there is no change in the risk perception/behavior in the financial markets. Second, abnormal condition (with feedback loop), a condition with a fairly massive and (tend to be) persistent capital inflows, which could potentially disrupt macroeconomic

balance. In this condition, it is assumed that the risk perception in financial markets changed (worsened).

There are two scenarios, namely baseline scenario and scenario with policy options. Under scenario with policy options, several feasible policy instruments can be utilized under policy mix strategy include: interest rate policy, foreign exchange intervention, change in Reserve Requirement ratio (RR), and change in Loan to Value ratio (LTV). These instruments can be used partially (one instrument) or jointly (combination of several instruments). Possible shocks include: declining world economic growth, decreasing global interest rate, and change in domestic macro variables.

Supporting Evidence

- a. Country Economic Profiles: Indonesian economic profile and challenges amid high global economic uncertainties: maintaining internal and external balances.
- b. Chart Packs of Indonesian Economy

Policy Issues

There are several literatures that participants must read before examining the case¹⁶. Should the time allocated for the case study session rather limited, participants are suggested to read an article exploring related policy issues on the linkages between monetary and financial stability written by Solikin M. Juhro (2014), *“The Linkages between Monetary and Financial Stability: Some Policy Perspectives”*, Bank Indonesia Occasional Paper.

Tasks, Guidance, and Tool for Problem Analysis consist of: (i) Case Questions and Policy Exercises, (ii) Guide for Policy Exercises, (iii) A Small

¹⁶ See Borio (2011), Committee on the Global Financial System (2010), De Nicolo, et al. (2010), Moreno (2011), and Noyer (2010)

Macroeconomic Model for Policy Exercises, and (iv) Monetary and Financial Stability Linkage and Monetary Policy Transmission Mechanism

Activities

Distribution of Materials. Participants are strongly recommended to read through some related materials/articles before the course. Since the time allotted for the workshop sessions is rather limited, advance reading will give participants /Groups extra leverage to accomplish the case exercises within the allowed time.

Division of Group. During the workshop, participants will be divided into several Groups. Each Group should pick a Group leader. The assigned case facilitators will re-brief each Group on the content, scope and structure of the case study.

During Case Study. Case study briefing, exercise (group work), group presentation, and wrap-up (takeaways)

Case Questions and Exercises

Discuss with your Group to answers the following questions. You should use information provided.

- a. How close are monetary stability and financial stability interlinked?
- b. How do you compare the linkage between monetary and financial stability in pre and post Global Financial Crisis of 2008/09 (GFC) period?
- c. What are the source of pressures (shocks) on the economy that could affect the linkage between monetary and financial stability?
- d. What are the policy strategy for mitigating the risks of macroeconomic imbalances (internal and external) amidst high global economic uncertainties, e.g. during episodes of capital inflows and outflows?
- e. What are the implication of monetary and financial system stability linkage on the central bank mandate?

Base Line Policy Exercises

Background

During the recent annual banking dinner (December 2012), the Governor of Bank Indonesia (BI) explained some progress of Indonesian economy in the last few years. He indicated that Indonesian economic growth remains strong, posted an average of 6.0% in the last-5-years, showing resilience amidst sharp fall in export as a result of pressures from the global economic slowdown. Business climate is improving, while consistent fiscal discipline has led to a downward trend of external debt. One thing that is interesting is the fact that this episode of robust growth did not occur with rising inflation. This was evidently reflected from the declining trend of inflation. Meanwhile, financial sector in particular domestic bank which remain in a good shape.

However, he stressed the importance of increasing awareness of the potential risks stemming from global economic uncertainty.

- a. Moderating global demand, paired with rebalancing source of growth toward domestic demand has led to a widening current account (CA) deficit (since the last quarter of 2011 the CA balance recorded a deficit), but also posed potential risk emerged from the increasing inflation expectation.
- b. On the financing side, reliance on external financing such as FDI and portfolio investment would be required. Although the surge in capital inflows during 2011-2012 has reflected positive sentiments of the global economy and the solid outlook of domestic economy prospect, this in turn would give pressure to rupiah exchange rate and financial system stability, in particular during periods of heightened risk aversion.

During the annual Board Meeting scheduled for the second week of the following month (January 2013), all Board members put a clear policy direction that the central bank's policy formulation should evaluate the

strategic role of monetary policy and financial system at the same time. In this case, monetary policy formulation needs to be further directed to anticipate macroeconomic instability risk stemmed from financial system. Therefore, the Board is planning to explore various policy options for managing internal and external balance and to deliberate on an optimal policy mix for 2013.

As a group of independent advisors recently appointed by Bank Indonesia, your group has been invited to share views and insights on the appropriate policy stance for 2013.

Baseline Exercise 1: No Feedback Loop – No Shocks

Consider that Indonesian economy is facing a normal surge of capital inflows, which is in accordance with the latest trends. In this condition, it is assumed there is no significant change in the risk perception in the financial markets.

Your Group is equipped with:

- a. Information on economic profile of the Republic of Indonesia 2008-2012;
- b. A small economic model summarizing the transmission mechanism of monetary policy in Indonesia;
- c. Assumptions on key exogenous variables; and
- d. A case guide for policy exercise exploring the framework and related technical aspects in addressing the case, including the impact of various policy measures.

Based on the above information:

- a. Is it a correct decision for the BI to keep the level of benchmark interest rate (BI Rate) constant at 5.75%, given the expected increase in financial inflows and rapid growth in financial indicators (credit, stock price, bond price) in 2013?

- b. Propose a policy recommendation on the appropriate interest rate policy stance that the BI should implement to control inflation rate in 2013.
- c. Should the effectiveness of interest rate policy be constrained by the persistent of capital inflows to the country, you may also consider another monetary instrument on the table, namely foreign exchange intervention (a sell or purchase). In this case, a sale (purchase) of foreign exchange will induce the Rupiah appreciation (depreciation) and have impact in reducing (increasing) banking sector's liquidity. It should be informed that, in normal circumstances (pressures on the exchange rate tend to be small), to meet the demand for the dollar in the market, the BI intervened the market by selling foreign exchange of around USD 1 to 300 million per month. In the case of moderate pressures, the amount of intervention increased by approximately 300 to 600 million per month. Keep in mind that the size of intervention will depend on the availability of foreign exchange reserves. Many central banks are eager to have a sufficient stock of foreign exchange reserves to be a cushion in the event of external shocks.

"It should be noted that, in accordance with the Rupiah stability mandate of the BI, your target is to maintain inflation target in the range of 4.5% - 6.5% ($4.5\% \pm 1\%$), so as to boost market confidence on monetary authority's commitment to achieving the internal balance. On the financial stability front, there is a growing thought that BI should consider conducive financial sector environment – reflecting the manageable pressures in the banking sector, stock market and bond market -- measured by a composite index of Financial Pressure Index (FPI) that empirically stands at around 105 – 110. Moreover, you should consider real GDP growth could be maintained at around 5.5%-6.0% and current account deficit not to exceed 3.0%."

- a. Discuss the viability of achieving those targets, using only interest rate policy and/or foreign exchange intervention, given the transmission mechanism of monetary policy in Indonesia.

- b. What sort of monetary and financial stability linkage and policy implication has your Group observed from this baseline exercise?

Baseline Exercise 2: With Feedback Loop – With Shocks

In the midst of lingering global uncertainties, it is feasible to consider that Indonesian economy is facing a condition with a fairly massive and (tend to be) persistent capital inflows, which could potentially disrupt macroeconomic balance, such as excess liquidity in domestic markets, less competitive exchange rate, and increasing inflation pressures. This condition will potentially change (worsen) risk perception in financial markets. Worsening risk perceptions in financial markets will reduce capital inflows and aggravate pressures in the financial sector. This mechanism shows us that even excessive capital inflows can induce macro-instability (imbalance) and thus give a negative feedback loop on the prospect of capital inflows.

During their deliberation in January 2013, the Board of Governor decides to implement your Group's interest rate policy (plus exchange rate intervention) recommendation. However, before the subsequent Board Meeting scheduled for April 2013, the global economy is hit by a major unfavorable news during the third week of May 2013.

As reported, in a prepared speech to Congress in Washington, Fed Chairman Ben Bernanke initiated a dovish tone. He said that a highly accommodative stance will remain appropriate. However, he did hint that a scaling back of quantitative easing (QE) measures could happen “in the next few meetings” if the Fed sees a sustained improvement in the economy.

Immediately after the announcement, some emerging market countries (including Indonesia) subsequently experienced sharp reversals of capital inflows, resulting in sizable currency depreciation. Capital inflows to emerging economies peaked in January 2013, slowed in the first half of 2013, and sharply reversed in the months immediately following Chairman

Bernanke's May comments. Thailand, Malaysia and Indonesia were particularly hard hit by capital outflows after Bernanke's comments, as investors bet on higher rates in the United States, as the Fed to begin reversing its low interest rate policies. This could lead to the increase in global interest rate. The global consensus forecasts released by a credible international organization projects that in the short-term world interest rate will rise by 0.25% to 0.5 % p.a. This increase may lead world economic growth to decline by 0.25% to 0.5% p.a.

With this scenario:

- a. First consider that the impacts of global interest rate shock and global growth shock can be transmitted through financial channel and trade channel, respectively or simultaneously.
- b. Re-answer the questions as in the previous regime (Baseline Exercise 1). Are these answers different from the previous "no-feedback loop – no shock" regime, especially in terms of the impact on monetary and financial stability linkages and "the magnitude" policy response needed?

Exercises with a Menu of Monetary and Macroprudential Policy Mix

Policy Mix Exercise with Feedback Loop – With Shocks

It is realized that considering the complexity of the problems encountered, the use of monetary instruments is not enough to cope with a variety of issues, especially in the financial sector. The use of monetary instrument alone will increase the cost of the policy.

During the tranquil time before the global shocks, the Board of Governor members, asked your Group to recommend a policy mix, in addition to monetary policy instruments (the interest rate policy and foreign exchange intervention).

The design of policy mix should optimally integrate monetary and macroprudential policy instruments. Of particular interest is the feasibility of

implementing a mix of policies containing interest rate adjustment, foreign exchange rate intervention, the reserve requirement (RR) and the loan to value ratio (LTV).

Although the existing law limits BI's mandate to maintaining price stability, the Board is of the opinion that financial stability is very important in order to preserve macroeconomic stability, so as pre-empting excessing risk taking in the financial system is an important complementary goal for the BI. The Board members are confident that for such risk taking behavior, if left unregulated, may prompt endogenously driven shocks in the domestic financial system that may in turn affect monetary stability. The consequence of this is that the BI policy strategy should be based on the use of monetary and macroprudential policy instrument mix.

As the global shocks unfold, the BI contacts your Group, requesting for immediate policy advice. One of the Board member specifically asks your Group to provide a recommendation on the appropriate policy mix to ensure that in 2013, internal and external balances will be well manageable. This means that:

- a. Inflation rate will not reach 6.5%;
- b. The Financial Pressure Index (FPI) should stand at around 105 – 110;
- c. GDP growth will be maintained at around 5.5% – 6%;
- d. Current Account deficit will not go above 3% of GDP.

Responding to this request:

- a. Can your Group arrive at a combination of policy instruments to achieve monetary and financial stability targets? In formulating your Group's policy mix recommendation, carefully consider results of your exercises or policy perspectives, as indicated in the case guide)
- b. Does your Group observe policy trade-offs (conflicts in achieving policy objectives)? Can you arrive at a satisfying policy mix for those multiple wishes?

- c. What would be your “first-best” advice to the Board? In this case, your Group may consider other policy aspects/tools beyond the scope of this exercises (given policy instruments available), such as communication strategy, policy coordination, etc.

13. Case Discussion

Instructors: BI Team. *Reza Anglingkusumo, Arlyana Abubakar, Sahminan, Ferry Syarifuddin, Alexander Lubis, Tarsidin*

During the case discussion, each group will address one question only. The following task after that is for each group to make a baseline policy exercise. Each group will have to make an exercise regarding the baseline scenario, which is no policy change from the policy in the last year. Looking at the baseline policy exercise, the green colored area is the policy with no change compared with last year's policy and its outcome. Assuming that in 2013 there is a shock in the form of capital outflows. If we do nothing, namely that there is no policy change, the result will be like this. You can explain about the conditions in 2012 and 2013. You can get the data from the various files we have given to you. You can also find in the suggested reading about the time condition data in order to answer Question 2, which is the baseline exercise. There are two kinds of explanation. This is without the feedback loop and this is with the feedback loop. Without means instant. Right after we enter 2013, in just one or two months, the result will be like this. Then there will be the response from the investors, namely withdrawing their investments through capital outflows. Therefore, this is the scenario with the feedback loop. Just make an analysis exercise like that. One or two pages would be enough.

Please have a look at page 6. This is the policy mix exercise. The policy mix exercise means that you have to choose one policy mix combination. Therefore, there will be many combinations and you have to make a combination of that. You have to choose which one is better, considering

economic growth, inflation or financial pressure index. You must choose the policy focus and then make an analysis. Please make two analyses: one without a feedback loop, which means instant, just one or two months, and one with a feedback loop for the long-term of more than three months. We will provide the Excel files in the Google Drive. Please look at the first sheet only. Please do not make any changes to the latter sheets because if you input any data in their letter sheets, it will break the file and you will have to copy new files. To do the third question, which is the policy exercise, have a look at this combination. You may only change the policy variables. The result will automatically change. Sheets 2, 3, 4 and 5 are there to show that this is a complicated process but the result is actually very simple. The results will update automatically. We have made it very simple for you.

We will help you in order to make it easier because we provide several options. This is to answer Question 2 of the baseline policy exercise. On the next page, we make some combinations. In the case without a feedback loop, you may choose one option, for instance, the first option is high policy rate with high FX intervention. The second option is high policy rate with low FX intervention. In the case with a feedback loop, there are some other options/combinations between monetary policy and macroprudential policy. You may consider economic growth, inflation, the current account deficit and financial pressure index; which one is better according to you? I would like to remind you that there is no correct answer and no wrong answer. In other words, everything is right based on your analysis and argument to explain about the option you have chosen. We have limited time.

Please remember, there are only three questions to answer. First, the conceptual question, which has no bearing on the second and third questions. Second, analysis of baseline policy. Third, the policy mix exercise. Please choose one option in the case of no feedback loop and one option in the case of with a feedback loop. After a 15-minute presentation, we will provide an opportunity for the other groups to ask questions. Due to time limitations,

however, if Group 1 has presented, for example, the first opportunity to ask questions will be given to Group 2. After Group 2 has presented, the first opportunity to ask questions will be given to Group 3 and so on. If we still have time, the other groups may also ask questions. After Group 1 has presented, Group 2 will *have* to ask questions so please prepare some questions. Please do not forget to wear your nametag at all times.

Please open the Excel file: worksheet of policy exercise 2019a. Please make a 'save as' copy so if anything goes wrong, you still have the original. Please begin discussing and answering the questions. There are three questions: A, B and C. A is the conceptual question and has no relation to questions B and C. Question B is the baseline exercise and question C is the policy mix exercise.

Finally, we have reached the concluding part of today's session. I am very sure you enjoyed number crunching and playing around with the Excel file. Did you have fun? I hope that you noticed one thing from today's exercise, namely that policy formulation involves weighing the trade-offs between various policy options. This is due to a scarcity of resources. In fact, economics is a science of scarcity. As a policymaker, you have to find an optimal solution to maximize welfare, which, in this case, is low inflation-high-growth, within the resource constraints. I wonder whether any of the groups introduced positive productivity shocks in their presentation. If positive productivity shocks were introduced, you have changed the parameters of the constraints and increased potential growth, which solves many issues. That is okay because we have been dealing with cyclical issues not structural issues. Let us see what you have come to propose as the optimal solutions. Today will consist of two sessions. The first session will include three group presentations, with the final three groups giving their presentations in the second session. You will have 15 minutes to present your optimal policy solutions, followed by a five-minute Q&A session with comments from your peers.

Group 1

Good afternoon, ladies and gentlemen. We are from Group 1 and would like to propose several policies to overcome the problems in the Indonesian economy in 2013. To start our presentation, allow me to introduce the members of this group. We have representatives from Banko Sentral ng Pilipinas, Bank Indonesia and BNM. We will take turns presenting our case. First, we will address how far monetary and fiscal stability are interconnected. I would like to first explain about monetary policy transmission. Monetary policy transmission will function after the policymakers examine their monetary policy response and instruments and affect the expectations of the economic agents regarding macroeconomic indicators, such as inflation and financial conditions. Monetary policy will also affect the resilience and efficiency of the financial system, consisting of financial intermediaries and financial markets. At the same time, however, financial conditions are also affected by the expectations of economic agents. Furthermore, the financial system will react to the expectations of monetary policy, as reflected by the interest rate, exchange rate, lending, balance sheet asset prices as well as money. At the same time, it will also directly influence the aggregate conditions of the economic agents, as reflected in terms of aggregate demand and supply. This will also affect the savings and investment behavior of households and the corporate sector as well as employment, wages and price setting. Aggregate supply and demand may also be affected directly by the expectations of the economic agents as well, ultimately influencing other aggregate outcomes, such as economic growth and employment. My colleague will explain further the connection with financial stability.

Participant:

Just to continue the discussion of the linkages between monetary and financial stability. We all know that monetary policy actions influence risk

perception and risk-taking in the financial system, such as banks. That could be reflected, for example, in risk-taking activities through lending or on the balance sheet, whether they are focusing on credit of the securities portfolio and so on. Based on this premise, we can say that in supporting monetary policy, there must be a stable financial system that would support that. That is when the financial stability framework comes in. That involves two-way directions which banks to each other and to other sectors, so it requires a holistic view of the system. That is when macroprudential policies come in. This is basically more on systemic risk management. This slide just tells us the linkages between financial stability and monetary stability.

Participant:

I would like to focus on assessing global economic developments and the impact on our national economy. Then we will move on to the policy we have suggested. In 2012, world economic growth moderated to around 3% and uncertainty in the global economy increased. Commodity prices also decreased. Despite the global economic slowdown, the Indonesian economy in 2012 maintained robust growth at 6.26%. Inflation was 4.3%, which is within the target corridor. We were aware that the uncertainty would continue throughout the year so my colleague will explain our projections of economic conditions in 2013.

Participant:

We are now in January 2013 and our outlook for the rest of the year is global economic moderation to 3% from 3.09% in 2012. We expect global interest rates to remain low given the ongoing QE measures in advanced economies. On the domestic side, given weaker global demand, we expect our domestic GDP growth to also moderate but still anchored by domestic demand. Our current account deficit is going to widen, given lower exports and higher imports. As a result, the rupiah will depreciate, and inflation will trend higher. Next, we will show our policy deliberations and what we

decided was the most optimal policy mix. A word of caution, however, given the time constraints, instead of coming with all the potential options, we have just followed whatever was given in the Excel spreadsheet. We have just chosen between the two, without coming up with more combinations. Neither did we come up with any additional shocks, we just followed whatever was given. Likewise, for potential output.

Participant:

Based on the outlook at the beginning of 2013, we have the problem of combining several policies to optimize GDP growth, inflation, current account deficit and the financial pressure index. We have three options: (i) no policy (dark blue column); (ii) 25bps hike in policy rate (orange column); and (iii) 50bps hike in policy rate and FX intervention (light blue column). Based on the simulation, we concluded that taking no policy measures would produce very high GDP growth yet a spike in inflation to 6.72%, which is beyond our target. On the other hand, the current account deficit would also narrow but the financial pressure index would increase. Based on these considerations, we proposed option three, namely a 50bps increase in the policy rate along with FX intervention.

Participant:

Following the announcement in May by the US to taper their QE measures, we saw that global economic growth would continue to moderate more than expected and interest rates would increase given the scaling down. As a result, our domestic economy would be impacted. Based on this set of factors, we have another set of policy measures. Given the time constraints, I will just quickly go through our set of policy measures. In terms of monetary policy, we realize that option 2 is the best, namely a 75bps hike in the BI Rate. If we have a policy mix, however, we would go with the second option, which is to increase the BI Rate by 100bps and increase the LTV ratio by 12.5%.

Participant:

In conclusion, we know that by comparing the policy options with only monetary policy and the orange one is the policy mix of monetary and macroprudential policy, the output is better if we do a policy mix. In terms of GDP growth, we saw that if only monetary policy, we would get 5.09% but if we combine with macroprudential policy, we can maintain GDP growth of more than 5.15%. In terms of inflation, we can control the rate within the inflation target at 6.41%. Regarding the current account deficit, we think that 3.29% of GDP is still manageable in Indonesia. We have also effectively maintained the financial pressure index within the target. We felt this was the best option considering the prevailing global and domestic economic dynamics.

Interaction	
<i>Group 2:</i>	The policy mix you chose included tightening policy by 100bps and increasing the LTV ratio by 12.5%. Sorry, I thought you were tightening the monetary policy but also tightening macroprudential policy but you are loosening macroprudential policy. My mistake, sorry.
<i>Participant:</i>	I just wanted to ask you how to communicate to the public this kind of stance? You have given a mixed signal to the public whether you are tightening or loosening so how would you communicate that to the public?
<i>Group 1:</i>	<p>In our communication, the central bank maintains a balance of conditions. Our main target is balance in the macroeconomy and financial sector. Consequently, we have tightened monetary aspects but loosened the financial system.</p> <p>By increasing the policy rate by 100 basis points, we would</p>

	also like to maintain the interest rate differential between rupiah and US dollars, which would help reduce the external issues.
<i>Instructor:</i>	Do you expect capital inflows to continue in 2013 or tighter liquidity conditions in the global economy?
<i>Group 1:</i>	<p>Given the new data points we got, namely that the US announced its plans to taper QE, there is a definite tightening of financial conditions going forward so we would expect a sharp reversal and even worse conditions moving forward, especially if other central banks in advanced economies follow suit. That is why we chose to increase our policy rate.</p> <p>Just to add some information, the capital account balance was positive in 2012. Depreciation was mostly caused by the current account deficit, so we were not worried about the inflows.</p>

Group 2

Instructor:

We answered Question 2. I would like to talk a little bit about the drama we had trying to answer this question. It was difficult to come to a conclusion with the answers because our colleague from BSP saw that there was no difference before and after the GFC.

Participant:

I thought it was already a given that monetary policy and financial stability should go together because under the Bangko Sentral ng Pilipinas (BSP), we monitor the banks and undertake monetary policy.

Instructor:

According to her, it is supposed to be the same because monetary policy and microprudential policy are in the same institution. I have explained to her that the situation is different in Indonesia, which she accepts. The question we answered was “how do you compare the linkages between monetary and financial stability in the pre-and post-global financial crisis periods?” The short answer is that it is different and the long answer will be explained by our colleague from Bangko Sentral ng Pilipinas (BSP).

Participant:

Back then, there were fewer linkages and a lack of coordination between supervisors and monetary policymakers. If the crisis happened because of exchange rate factors, tight monetary policy has the potential to stabilize exchange rates and the financial sector. In the event of a banking crisis, however, the opposite occurs, namely that a tight monetary policy stance will reduce the probability of a reversal due to a currency mismatch at domestic banks and the discretionary powers of the central bank in terms of supplying liquidity in a crisis.

During the global financial crisis, Borio and Zhu (2008) put forward the existence of the risk-taking channel, while Altunbas et al. (2009) found evidence that unusually low interest rates over an extended period cause an increase in the banks’ risk-taking behavior. That is what happened before in Indonesia. There was a rise in risk-taking behavior amongst banks. Such risk-taking behavior will eventually drive up demand for new loans and asset prices. The GFC provided a key lesson that the financial sector plays a crucial role in macroeconomic stability because of its behavior that triggers excessive pro-cyclicality, which is not just the result of interactions between the business cycle and financial cycle but also affected by the risk-taking cycle, characterized by over-optimism during economic booms and over-pessimism in times of economic bust.

Before the crisis, there was a lack of coordination among supervisors and policymakers but post crisis, Bank Indonesia addressed several measures, such as liquidity in the financial system, raising the reserve requirement from 5% to 8%, effective in 2010, and increasing the frequency of auctions from monthly to weekly. This is because there was a need to strengthen the macroprudential regulatory framework. This limited risk-taking behavior among banks.

Conclusion. Dynamics during financial crises have shown that monetary policy needs to be further directed towards anticipating macroeconomic instability risk stemming from the financial system. This implies that healthy macroeconomic management should also consider financial system stability as the foundation to realize a sustainable macroeconomic environment. Quoting Juhro (2014) *“There is no macroeconomic stability without financial stability.”* Without the two policies working together, there would be instability.

Participant:

I would like to share the baseline policy exercise. The conditions are the same as Group 1 so I will not repeat it again here. We will go straight to the scenario. If Bank Indonesia holds the benchmark interest rate at 5.75%, it would increase financial indicators, such as credit from 18.01% to 18.86%, with the stock price index increasing from 4,119 to 5,025 and bond yield decreasing 5.85 to 5.45. Notwithstanding, it would not be the correct decision to maintain a constant BI Rate at 5.75% because inflation is so high, which would also increase from 4.3% in 2012 to 6.72%, exceeding the central bank's inflation target of 5.5%±1%. We propose increasing the BI Rate by 25 basis points to 6% per Scenario 1. Inflation would therefore decrease to 6.12%. Nevertheless, there is a trade-off with lower GDP and a wider current account deficit. We tried several scenarios using different monetary instruments, such as foreign exchange intervention, to optimize the inflation rate and GDP growth. Under Scenario 2, we see that inflation will be better

than Scenario 1 but there is still a trade-off with GDP growth and the current account deficit. By increasing the intervention, we would lower the financial pressure index. In terms of the no feedback loop and no shock scenario, we propose Scenario 2, using a combination of interest rates and foreign market intervention. Under Scenario 4, we want to show that we can only use foreign intervention so we did not increase the interest rate. This would achieve the inflation target at a rate of 6.49%, which is within the target range. According to this scenario, we have better GDP growth and narrower current account deficit. Combining the instruments is better than using a single instrument.

Participant:

For the baseline exercise 2b: with feedback loop and with a shock, we found that as a small open economy, Indonesia is vulnerable to global/external developments. Immediately after the US announced a potential future scaling back of quantitative easing measures, Indonesia experienced sharp reversals of capital inflows (feedback loop). Compared to conditions without a feedback loop, some indicators deteriorated, including exchange rate depreciation due to capital outflows (selling domestic assets), CPI inflation through imported inflation and, most dangerously, risk perception in the financial markets (financial pressure index and macro risk perception). Therefore, the magnitude of the policy response required would be higher compared to when there was no feedback loop.

As we can see from the table, with no monetary policy, CPI inflation will increase to 8.12%, which is above the central bank's inflation target of $5.5\% \pm 1\%$. In order to maintain the target, therefore, the central bank should increase its policy rate by at least 75 basis points to 6.5%, which is higher than the first baseline (6.0%), but that would reduce GDP growth from 6.03% to 5.15%. Therefore, the central bank needs to implement another policy, namely forex intervention (selling US dollars) to optimise the inflation rate and GDP growth. By only increasing the BI Rate to 6.25%, inflation would again exceed the target at 6.84%. Increasing the BI Rate to 6.75% would lower GDP growth

to 4.86%, which is very low compared to the readings in 2011 and 2012 at 6.49% and 6.26% respectively. According to Scenarios 2 and 3, forex intervention by selling US dollars would provide greater flexibility for us to increase the policy rate to 6.25% while maintaining higher GDP growth at 5.19%.

Participant:

Concerning the policy mix, a policy rate of 5.75% in 2013 would push inflation beyond the target corridor and the current account deficit beyond 3% of GDP. We tried various policy mixes. The first option was to raise the policy rate to 6.25% with USD2 billion worth of forex intervention, which would result in on-target but higher inflation and a larger current account deficit. We can see that the financial pressure index 104.75. Another option was to loosen the LTV ratio combined with the same amount of forex intervention. This produced a worse result for inflation and the current account deficit. After the simulation, we increased the policy rate to 6.75% and loosened the reserve requirement from 11.50% to 10.50%. We also adjusted the LTV ratio and the intervention. We found that the optimal solution in 2013 would produce an inflation rate of 6.37% but GDP would still fall below 6% and the current account deficit would be 3.37% of GDP. We also see that the financial pressure index is within the target. We had to choose this solution because our trade-off was that we had to maintain low and stable inflation to ensure financial stability but for GDP growth and the current account deficit we had a strategy to communicate with the government to introduce fiscal stimuli and perhaps restrict consumer imports. The central bank would simultaneously need to communicate with the public regarding the current conditions and what needs to be done about

our future policy path. That would ensure that all stakeholders could accept the policies.

Interaction	
<i>Group 3:</i>	You recommended applying consumer import restrictions. What kind of consumer goods would you restrict? As we know, Indonesia depends on imported goods, such as raw materials and consumer goods. If we restricted consumer imports, I would be afraid of the spillover effect in the trade sector, which is one of the main contributors to GDP growth in Indonesia.
<i>Group 2:</i>	<p>We proposed consumer import restrictions because when we raised the policy rate, the bigger current account deficit with exchange rate appreciation, would lead Indonesia to import more and more goods. Therefore, we would only need to restrict imports of consumer goods, not raw materials and capital goods.</p> <p>We did not come up with any specific product to restrict but the intention was to reduce the current account deficit induced by a stronger currency.</p>
<i>Participant:</i>	You recommend restricting imports but is that within Bank Indonesia's mandate?
<i>Group 2:</i>	We would do that in close coordination with the government. We could make a recommendation to the government.
<i>Instructor:</i>	As part of your strategy, you recommended implementing fiscal stimuli. I would like a comment from our colleague at the fiscal policy office on how to explain the strategy. Given the conditions at that time, the fiscal deficit was

	around 2.8%.
<i>Group 2:</i>	We consider a deficit of below 3.0% to be manageable and sustainable. According to the regulations, we are not allowed to exceed 3%. Rather than restricting imports of certain goods, previous experience has shown that higher taxes for luxury goods help to reduce imports.
<i>Instructor:</i>	One of the weaknesses of our Excel-based simulation models is a lack of fiscal policy explicitly in the model. Actually, there would be a feedback loop from fiscal stimulus. Next year, we will have to include fiscal policy into the model.

Group 3

Participant:

The first test for our group from the conceptual question was No. 3 about the sources of pressure or shocks on the economy that could affect the linkages between monetary and financial stability. Here, we already indicate some internal and external shocks. At that time, in 2013, the Federal Reserve planned to hike its federal funds rate. We were concerned that the FFR hike would trigger capital outflows. To maintain capital in our economic system, the central bank should increase the BI Rate, which would feed through to higher lending rates and potentially higher non-performing loans in the banking sector. That was the first external shock that we indicated at the time.

Participant:

The second external shock that we discussed in our group was a global economic slowdown. Global economic moderation could reduce international commodity prices. Consequently, exports would also decline, thus increasing the current account deficit. Furthermore, this could lead to rupiah

depreciation and increase the risk of private sector debt, for example companies in the agricultural and mining sectors.

Participant:

Thank you for coming to our press conference. In terms of the internal shocks, we discussed one potential internal shock that could happen in the Indonesian economy. The economic structure of Indonesia still depends on domestic markets and government spending, especially in every province of Indonesia. Before provincial budgets have been approved, we see muted local economic activity. If budget realisation by the central government and local administrations is slow, it would create a shortage of liquidity in the market. The problems would go to the banks due to lower repayment capacity. If the cost of funds in the banking industry from securing loans from other banks in the money market increases due to higher interest rates, because higher interbank rates pass through to consumer loan rates, there are two possibilities. First, credit risk will be higher for outstanding loans disbursed by the banking industry due to higher lending rates. Second, demand for new loans would decrease due to a higher lending rate. Consequently, businesses may be reluctant to expand after the interest rate hike. This would undermine investment in Indonesia and GDP growth due to a business slowdown. That is why internal shocks could be a problem for the Indonesian economy if government spending decelerates.

Instructor:

To further emphasize what Ina mentioned as potential sources of pressure to the Indonesian economy, namely capital outflows, in the bottom chart you can see that the composition of funds flowing in are mostly short-term placements in bonds. If you look at the top chart, you can see that most of those bond holders are foreign nationals. This validates our concern about the potential for a sudden reversal when the FFR increases.

This takes us to baseline exercise 1. We mentioned the possibility of capital outflows. At the same time, we have an issue of high inflation at 6.72% if no policy actions are taken. In this light, under the no feedback loop scenario, it would be better if the BI Rate increased to 6.25% from 5.75%, accompanied by forex intervention totaling USD3 billion. This would maintain inflation within the target range of 6.22% at the cost of slower GDP growth yet still above 5%, solid credit growth and a wider capital account deficit yet still manageable at around 3% of GDP. This would also lead to a healthier financial pressure index. We feel that this would be the best policy choice moving forward under the no feedback loop model.

Participant:

According to baseline exercise 2, we need a larger policy response under the feedback loop scenario to achieve a similar outcome. For this scenario, we think the best move is to only increase the BI Rate to 6.5%. This would maintain inflation within the target range and GDP growth above 5%, which we think is good enough. The current account deficit is slightly larger than 3% of GDP and FDI is also within the range. Therefore, we think this would be the best policy response.

Participant:

In terms of the policy mix, after a long discussion we came to the conclusion that it would be better to increase the BI Rate to 7.25% and conduct forex intervention to the tune of USD5 billion. Of course, this monetary policy would not be enough to maintain the economy, so we also loosened the LTV ratio to 82.5%. Inflation would thus remain on target at 6.44% with GDP growth in excess of 5%. Nevertheless, the current account deficit widened slightly beyond 3%. Furthermore, FDI would remain in a suitable range to sustain investor trust with adequate foreign exchange reserve assets for intervention efforts.

Interaction	
<i>Group 4:</i>	The source of pressure is correct and the end result is right but the linkages are not correct because whenever there are liquidity shortages, the central bank is always there to prop up the liquidity. Although lower government spending may result in lower investment and lower GDP, it does not occur through the credit market channel.
<i>Group 3:</i>	We assume here without any policy intervention from the authorities first.
<i>Participant:</i>	You said that rupiah depreciation would lead to the risk of increasing private sector debt. Do you know roughly by how much in US dollars private sector debt would increase? I do not have any idea how many FX loans there are in Indonesia.
<i>Group 3:</i>	We do not have the data on hand but from recollection it was not as low as people might think it should be, but I do not have the actual data on hand.
<i>Instructor:</i>	Actually, you can see the figures in the presentation by Nathan of the IMF.
<i>Participant:</i>	You have explained the channel which external shocks are transmitted through the credit market. What is your view of the exchange rate channel? Is there any transmission? Capital outflows can also affect exchange rate volatility. Could you explain to us your view on that transmission?
<i>Group 3:</i>	I think capital outflows would result in a shortage of US dollars if demand for US dollars in Indonesia remains high. On the other hand, however, we do not have a stock of US dollars in the event of a capital outflow. It is an issue

	of supply and demand. When demand remains but supply decreases, the rupiah will depreciate. There are not enough US dollars in the market but we still need US dollars to pay for imports and repay debt. This may lead to rupiah depreciation. That is the mechanism.
<i>Group 1:</i>	I think the FX reserves are not only to cover intervention measures but also to cover short-term liabilities and import payments as well.
<i>Instructor:</i>	USD5 billion in forex intervention is actually very bold.
<i>Group 1:</i>	Is it applicable to raise the LTV ratio to 82.5% rather than a whole number in terms of implementation?
<i>Group 3:</i>	If you look at the marginal increase, it is 10%, so from 72.5% to 82.5%. With the constraints given to us, where we had to hit a maximum of 6.5% inflation and GDP growth of 6%, which we were unable to achieve, we opted to push for stability rather than growth. In order to do so, one of our policy responses was to loosen the LTV ratio since we had already tightened monetary policy.
<i>Participant:</i>	This was one of the discussions that made us almost miss lunch. Yes, 82.5% is a weird number but like Doni just explained, as the central bank, our main target is price stability by increasing the BI Rate. To maintain dynamic economic activity, however, we chose a policy mix that incorporated tighter monetary policy with looser macroprudential policy by increasing the LTV ratio. We are pro-stability and pro-growth.
<i>Group 3:</i>	The main reason we put 82.5% is because the default was 72.5% so we assumed it was possible to use something like

that.

Group 4

Participant:

Good afternoon ladies and gentlemen, we are from Group 4 as advisers to the governor. I would like to allow our honorable Governor, Jati Waluyo, to clearly communicate Bank Indonesia's policy response to current conditions. Mr Governor the floor is yours.

Participant:

Before I begin, we have a follow-up question from our governor regarding the conceptual question that I would like to answer. *What are the policy strategies for mitigating the risk of macroeconomic imbalances, internal and external, amidst high global economic uncertainty during periods of capital inflow and outflow?*

In general, we should use the policy mix strategy. We combine monetary policy and macroprudential policy. In addition, we also want to pursue exchange rate intervention to manage the volatility and some agreements with other counterparts, such as bilateral swap agreements and also promoting the use of local currency. There are two episodes, which I would like to discuss separately. First, the period of capital outflow. During this period, I think we should increase the policy rate such that the interest rate differential is sufficient to attract foreign investors. However, higher interest rates will have a negative impact on economic growth, so we will loosen the macroprudential policy measures by increasing the LTV ratio, lowering the reserve requirements and increasing the LDR in order to stimulate the economy. Furthermore, to manage exchange rate volatility, we need to intervene in the domestic exchange rate market using the central bank's reserve assets. I also recommend bilateral currency swap agreements

with other central banks in foreign currencies and to promote the use of local currency.

Second, during the period of capital inflow, we recommend the opposite. To limit foreign investors, we should maintain the policy rate. In a situation where economic growth and inflation are low, we could reduce the policy rate, however. To mitigate the negative impact on financial stability, we will tighten the macroprudential measures. Exchange rate appreciation has a negative impact on exports, therefore we would need to coordinate with the fiscal authority to stimulate export growth. In addition, we also need to accumulate reserve assets as a buffer for future adverse episodes.

Baseline Scenario: No Feedback Loop – No Shocks (2)

It is the correct decision for Bank Indonesia to maintain the BI Rate constant at 5.75% *if* we also tighten macroprudential measures. On one hand, we want to contain the capital inflow which could have a negative impact on economic sustainability yet, on the other hand, we want to stimulate economic growth.

Since our mandate is to achieve the inflation target of $5.5\% \pm 1\%$, we assumed that an interest rate of 5.75% would be sufficient to control inflation. Therefore, we will not propose a new policy recommendation. The effectiveness of interest rate policy is constrained by the persistence of capital inflows due to potential exchange rate appreciation that could widen the current account deficit (trade channel). Capital inflow persistence will also increase credit growth that could overheat the economy and create inflationary pressures (financial channel). Consequently, we should consider other intervention measures to deal with the exchange rate appreciation and also macroprudential policy to deal with the effect of capital inflows to the financial sector.

Baseline Exercise 1: No Feedback Loop – No Shocks (3)

Next, we were unable to achieve the desired targets only using interest rate policy and intervention. Instead, a policy mix approach is required. In order to have sustainable economic growth, we have to maintain monetary and financial stability. Based on the baseline exercise, if we increased the policy rate it would endanger financial stability by amplifying capital inflow. Therefore, macroprudential measures should be used to manage financial stability.

Baseline Exercise 2: Feedback Loop – Shocks (1)

An increase in the global interest rate would lower global economic growth and also reduce the international commodity price index. This would impact Indonesia's national economy through the export sector. In this case, a higher global interest rate shock would contribute to capital outflows from emerging markets (financial channel). It would also undermine global growth and compress global demand, leading to lower international commodity prices. Decreasing commodity prices would have a huge impact on the Indonesian economy because most Indonesian exports are raw materials/commodities, including coal, crude palm oil (CPO), rubber, nickel and so on.

It would not be enough to maintain a constant policy rate at 5.75% because policy intervention itself is not enough to contain the capital outflows. We propose increasing the interest rate to limit the capital outflows that could harm the rupiah and reducing the inflation rate to achieve the desired target.

Policy rate effectiveness is constrained by potential capital outflows and a potential decline in commodity prices because capital outflows can trigger exchange rate depreciation and, thus, inflationary pressures. Furthermore, lower commodity prices would contribute to flatter economic growth.

Policy Mix Exercise – No Feedback Loop (Near Term)

We can effectively accomplish the desired targets through a mix of monetary and macroprudential policies. We suggest increasing the policy rate and loosening macroprudential policy through the following measures: (i) increasing the interest rate by 50bps; (ii) lowering the reserve requirement by 50bps; and (iii) setting the LTV ratio to 85%.

Based on the model, those measures would achieve the following outcomes:

- 6.15% inflation (within the target);
- 5.86% economic growth (slightly below target but okay);
- 3.2% CAD (slightly above target); and
- FPI of 110 (within the target).

Policy Mix Exercise –Feedback Loop (Long Term)

We can accomplish some of the desired targets through a mix of monetary and macroprudential policies. We suggest increasing the policy rate and loosening macroprudential policy through the following measures: (i) increasing the interest rate by 100bps; (ii) lowering the reserve requirement by 50bps; and (iii) setting the LTV ratio to 85%.

Based on the model, those measures would achieve the following outcomes:

- 6.49% inflation (within the target);
- 5.2% economic growth (slightly below target but okay);
- 3.29% CAD (slightly higher); and
- FPI of 107 (within the target).

Policy Mix Exercise

There is a trade-off in achieving the policy objectives. On one hand, we want to promote sustainable growth but, on the other hand, we want to achieve price stability (inflation target) and financial stability. We need to

coordinate with the fiscal authority to stimulate export growth and the Indonesian Financial Services Authority (OJK) to ensure the compliance of related policies. We also need to clearly communicate the central bank's policy stance to the public to align public expectations with the central bank's policies.

Interaction	
<i>Instructor:</i>	You are proposing a hike in the interest rate so much so that the interest rate differential becomes so high that it will attract foreign investors. This means that you are targeting your interest rate for capital flows but your core mandate is price stability. First, you must secure price stability, while simultaneously considering growth. Just loosening the macroprudential policy would not be able to boost credit or the economy because the cost of credit will go up once you have increased the policy rate by so much. These are still normal conditions with no shocks. You are assuming that macroprudential policy instruments have already been applied and you want to loosen them. That is my observation.
<i>Participant:</i>	You are absolutely right. The main target is to keep inflation within the target range. We achieved that. Otherwise, there are some conditions next to the main target given by the board of governors, such as a stable current account deficit at 3% of GDP. So far, nobody has achieved that. High GDP growth is another target. As a developing economy, Indonesia is developing very well from my point of view but growth exceeding 5% would be very welcome. That is why we set our targets like we did, with all the goals in mind.

<i>Participant:</i>	You have tightened monetary policy by increasing the interest rate and reserve requirements. On the other hand, however, you have loosened macroprudential policy by increasing the LTV ratio. Such policy measures, in my view, would encourage the banks to switch focus from SMEs towards the property sector because the property sector is becoming more attractive in terms of lending activity compared with the other sectors. This could make the risks on the macroprudential side higher than before. What is your opinion about this?
<i>Instructor:</i>	The perspective of the bank to choose the specific sector in this case, meaning housing loans, depends on the risk appetite of the banks. There is a slightly different procedure if you want to disburse loans to specific sectors, especially housing loans and for SMEs. Special expertise is required to disburse loans to those sectors. Therefore, we tried to loosen macroprudential policy here through an LTV ratio of 85% in order to provide a signal to the public that we are not only doing monetary policy, but we are also concerned about macroprudential policy, which can have a positive impact on economic growth.
<i>Group 4:</i>	If we set the LTV ratio to 85%, it would perhaps encourage the banks to give more loans to construction because it moves more quickly than other sectors. We are also observing economic conditions, consumer conditions and financial conditions when applying the LTV ratio. In the near term, loans disbursed to the construction sector would be relatively stable.
<i>Participant:</i>	In summary, the best way for us is to increase the interest

rate by 50bps to attract capital, while decreasing the reserve requirement in order for the banks to provide credit to the real economy. The LTV ratio will increase demand for credit. The reason we chose these three scenarios was basically to meet our targets. That was our main objective. If this was transferred more to the property side, we could revise our decision.

Group 5

Participant:

We had an intense discussion and we learned a lot. Determining the most effective policy mix is a difficult decision due to the numerous trade-offs. If we wanted to tackle inflation, for example, it would cause an economic slowdown or higher unemployment. This is a challenge.

Participant:

What are the implications of monetary and financial system stability linkages on the central bank mandate?

The central bank's conflict (trade-off) is between targeting monetary stability and financial system stability itself. Strengthening the monetary and financial system stability framework requires appropriate monetary and macroprudential policy integration. In order to strengthen the framework of monetary and financial system stability, the central bank must be more flexible and creative in responding to emerging uncertainties within the economy and to think beyond public perception.

We know that there are monetary policy tools at Bank Indonesia, for example reserve requirements. On the other side, there is also financial system stability, for which Bank Indonesia mainly applies loan-to-value ratios or reserve requirements and sometimes they use buffers. This should be based on soundness and communication, as we have studied over the past

few days. For the central bank, we know that during the period in question there was high inflation and capital inflows. As a team, we decided that the exchange rate should be more flexible coupled with dual intervention between the national currency and US dollar. Nevertheless, in this case the LTV and RR-linked financing-to-deposit ratio (FDR) are more appropriate.

Baseline Exercise 1: No Feedback Loop – No Shocks

During the period from 2010-2012, GDP was declining. In terms of inflation, the rate decreases at the beginning of the period before experiencing a slight increase by around 13%. The current account surplus is declining before experiencing a deficit due to a decline in exports and imports and sliding international commodity prices. Broad money (M2) and Net Foreign Assets are increasing. There is an increase in credit growth, lower bond yields and stock prices are rising. In addition, the Financial Pressure Index (FPI) is also in decline. The global economy is moderating.

Assuming there is no change in the interest rate (5.75%), the potential impact would be rising inflation, reaching 6.72% (exceeding the target). On the other hand, GDP would also decrease to 6.03%. We therefore propose to take no action, presuming there are no shocks.

Proposed Policy Actions

1. Option 1: Increase the policy rate to 6.25% (BI Rate + FX intervention):
 - CPI index will increase moderately to 6.22% (within target);
 - GDP will decline to 5.78% from 6.26% in 2012;
 - Current account deficit will increase to 3.12% from 2.78% in 2012.
2. Option 2: Increase the policy rate to 6% (BI Rate + FX intervention):
 - CPI index will increase moderately to 6.8% (not within the target);
 - GDP will decline to 6.06% from 6.26% in 2012;
 - Current account deficit will increase to 3.06% from 2.78% in 2012.

Conclusion. We propose Option 1 because we want to focus primarily on price stability. Maintaining inflation within the target corridor, however, would have a moderate impact on growth and the current account deficit. This option is the least costly because any increase in the policy rate (BI Rate + FX intervention) beyond 6.25% would result in high inflation, breaching the core mandate.

Question 4: In order to control the excess liquidity in the financial market due to capital inflows, we propose that BI adopts dual intervention policy through FX intervention and selling bonds to absorb the excess liquidity. Assuming high credit growth, we propose tightening the LTV ratio and countercyclical provisioning.

Proposed Policy Actions:

- Policy rule
- Reserve requirements
- Loan to value
- FX intervention

Baseline Exercise 2 – With Feedback Loop and Shocks

We chose the worst-case scenario. Given the global interest rate increase of 0.5% and global economic growth decline of 0.5%, the potential impact will be as follows:

- GDP rate: 5.42% (initially 5.47%)
- CPI: 7.62% (initially 7.34%)
- CAD: -3.07% (initially -3.13%)
- FPI: 109 points (initially 107.67 points)

In order to tackle the external shocks, we would increase the policy rate 50bps to 6.75% (initially 6.25% without shocks). As a result, CPI would

decrease to 6.22%, GDP would increase to 5.78%, the current account deficit would be -3.12% and the FPI would decrease to a level of 105.96.

The team also thought about the optimal policy mix to ensure stability as our main goal. We just increased the policy rate due to inflation as our main target. We maintained the reserve requirements because we had no conflict between the two systems. We can see that there is financial stability and monetary policy are going along the same path. Therefore, we just increased the LTV ratio from 72.5% to 87%. This is our fixed policy, which we thought was the best choice. From the table, we can see that GDP is 5.21% and inflation is less than 6.5% but we were unable to reduce the current account deficit to less than 3%. Our most important recommendation at this level is to have good internal and external communication. In addition, fiscal policy would also have to support this path. This policy mix yields better outcomes in terms of the least cost.

Interaction	
<i>Instructor:</i>	Thank you for your presentation. I would like to ask about the impact of these macroprudential tools. Which macroprudential tool do you think is most effective in terms of GDP growth: LTV ratio or reserve requirement ratio?
<i>RBI:</i>	LTV.
<i>Instructor:</i>	That also affects CPI inflation. What is the combination of macroprudential variables? Do you have any opinion?
<i>Participant:</i>	The main idea here is that we tried to find the best policy mix solution in this area. We have maintained GDP growth. The largest impact was on CPI and GDP, more than the current account deficit. It was harder to adjust to our last target (CAD).

<i>Participant:</i>	From the slide, I see you have an optimal solution because CPI inflation is within target and GDP is not too low. GDP in Indonesia is lower than inflation so how would you communicate to the public what has happened and what to do next? I am afraid that GDP is lower than inflation in 2013 in this case.
<i>Participant:</i>	At this stage, we are not moving to the expansionary policy, we have maintained a contractionary policy. The policy is trying to constrict rather than expand because our main target is inflation. We do not want to make our inflation higher, which would affect price stability in the country. The goal to which the committee has agreed is price stability, so we tried to make contractionary policies. This may restrain GDP growth but inflation is the primary target. The policy mix always yields to better outcomes in terms of the least cost.
<i>RBI:</i>	Just to add that securing price stability is a necessary condition for securing sustainable growth in the medium term. Therefore, price stability should always come first.
<i>Participant:</i>	Addressing the last question about lower GDP than CPI inflation, the main objective of the central bank is to maintain price stability. Therefore, although GDP is lower, I do not think this is a problem because the main objective is price stability. The mandate of Bank Indonesia is price stability, but the central bank also strives to maintain the value of the rupiah and contribute to economic growth. For the central bank, in addition to maintaining price stability, it must also think about economic growth.
<i>Participant:</i>	Regarding my own point of view, as far as I am concerned

	during the global financial crisis era, Indonesia was one of the least unstable countries in the region compared with other ASEAN nations. Indonesia performed well in terms of GDP despite moderation compared to many other countries, excluding India and China. Despite decreasing GDP growth slightly, during that period if we tackle the inflation rate, it should be okay. In my point of view, 5% GDP growth is quite reasonable during that period.
<i>Instructor:</i>	These are my kind of central bankers. They are hawkish. Policy mix yields in better outcomes in terms of least costs.
<i>RBI:</i>	An adviser from the Bank of England visited RBI and, in his talk, he was saying that his job was not to advise his boss but to defend what he is doing. Sultan is our governor and we are here just to defend him.

Group 6

Participant:

What we have learned from the workshop is that policy implementation is very complicated and debatable. To achieve the goal, we must stick to the principles and policymaking mandate. We had the same questions as Group 1 but we will answer in a different way.

How Close Are Monetary Stability And Financial Stability?

Regarding the relationship between monetary stability and financial stability, there are two hypotheses that mention the relationship between monetary stability and financial stability:

- Monetary Stability => Price Stability
- Financial Stability => Sound banking system, stable asset prices and efficient interest-rate transmission.

According to the conventional definition for the first hypothesis, monetary stability supports financial stability. There is no trade-off between monetary stability and financial stability. According to the proponents, monetary stability is a sufficient condition for financial stability. Monetary stability is affected by 1) economic growth; and 2) employment, which both determine inflation according to the Phillips curve rule. Then, inflation affects asset prices and deteriorates the banking system's health, so it affects financial stability.

According to the second 'New Environment' hypothesis, there is a trade-off between monetary stability and financial stability through the central bank's actions, which could determine investor behavior. Successful inflation control by the central bank leads to overly optimistic perceptions. Therefore, asset and credit market activity exceeds potential (overheating). In the short-term, the empirical evidence shows that disinflation leads to lower nominal interest rates and moral hazard, high-risk lending, low inflation and asset price bubbles.

Participant:

To keep our mandate, namely low inflation, we had to increase the policy rate by 25bps from 5.75% to 6.00%. The higher rate would squeeze broad money and lower GDP growth to 5.74%. There is a trade-off. As an impact of lower GDP growth, the current account deficit would increase slightly to 3.14% of GDP. Furthermore, the FPI would decrease to a level of 107.5. Consequently, CPI inflation would decrease to 6.12%, which is within the target.

Baseline Policy with No Feedback Loop and No Shocks

Participant:

I would like to offer another alternative, not only raising the BI Rate but also using FX intervention. The second alternative is to raise the BI Rate

by 50 basis points to 6.25%, accompanied by FX intervention to the tune of USD3,000 million. The result is quite similar to the first alternative. GDP growth would increase slightly to 5.78% but CPI inflation would also increase to 6.22%. Both indicators are still within their respective targets. The current account deficit would increase to 3.12% of GDP, which is slightly lower than the first alternative. Those are the two alternatives we would like to propose for the baseline policy with no shocks and no feedback loop.

Baseline Policy with Feedback Loop and Shocks

Participant:

We know that after the announcement of the US Federal Reserve Chairman, Ben Bernanke, it could lead to an increase in the global interest rate. From the impact of global interest rates and global growth shocks, world economic growth is expected to decline from 3% to 2.5% and the LIBOR rate increase from 0.3% to 0.8%. Under these conditions, a policy was made to increase the BI Rate to 6.5%. With this policy, inflation would decline to 6.49% from 8.41% previously, with GDP growth at 5.03%, a current account deficit of 3.22% and the FPI level of 104.28.

Participant:

Continuing to the second alternative with the same scenario as Lukman, to maintain inflation at a maximum of 6.5%, we would increase the BI Rate to 6.75% with FX intervention totaling USD2,000 million. Inflation would remain under control, even lower than the first alternative, at 6.42%. There would be a trade-off with lower GDP growth from 5.97% to 5.05% and a large current account deficit from 3.03% to 3.23%. We think that this is the best policy response.

Participant:

I will talk about our policy mix recommendation with the feedback loop. We propose a combination of the following instruments, namely to tighten the policy rate and ease the macroprudential policy tools as follows:

- BI Rate hike: +100bps
- RR Ratio: +150bps
- LTV Ratio: +750bps
- No FX intervention

That combination would lead to GDP growth of 5.3%, inflation of 6.65%, a current account deficit of 3.2% and an FPI of 108.53. We are still a long way from the GDP growth target but we were able to achieve the inflation target. Furthermore, the financial pressure index is also within the target range. When we used only the short-term interest rate, we were not able to achieve multiple targets. Multiple targets require multiple instruments. Therefore, we eased the macroprudential tools. We need to keep in mind that there is a trade-off between using different instruments. Macroprudential instruments also influence inflation, so when deciding upon an optimal policy mix, the policy trade-offs must be considered. We did not offer any FX intervention in order to be consistent with monetary policy tightening. Under global financial tightening, it would not be a good recommendation to sell reserve assets. To decrease the current account deficit, it would be better to depreciate the domestic currency but to do so, the central bank would need to buy FX dollars. Nevertheless, this would also confuse the monetary policy communication because while you are tightening your domestic currency it is hard to buy FX dollars to depreciate the currency. That is why we did not offer any foreign currency intervention in our policy mix.

Interaction	
Group 1:	Thank you for the nice presentation. When you apply the policy mix recommendation, what is the reasoning behind

	letting inflation exceed the target range? What is the reason you push GDP growth?
<i>Instructor:</i>	We added more weight to GDP growth in order to increase growth but inflation is still very close to the target corridor. If we did not ease the macroprudential parts, GDP growth would be very low. There was a trade-off so we decrease the weight of the price stability objective. We push GDP growth because there would be capital outflows. At that time, there were tighter global liquidity conditions due to the Taper Tantrum, which would also undermine GDP growth. Credit growth would be negatively affected by the capital inflows so for that reason, to support credit growth and GDP growth, we implemented these measures.
<i>Group 2:</i>	You tighten the policy rate to 6.75% but according to this scenario you buy dollars and sell rupiah to the market. I think such measures would make the BI Rate not run effectively because it will decrease your call to reduce inflation. Could you give an explanation? The policies contradict one another.
<i>Participant:</i>	We have already run the simulations and when we manipulate the BI Rate and the FX intervention, there is a trade-off between GDP growth, the CAD and inflation. Therefore, I feel that this is the optimal response when we get the maximum target at 6.42%. If we increase the BI Rate beyond 6.75% and reduce FX intervention, it would breach the maximum target of 6.5%.
<i>Participant:</i>	We had two alternatives. First, to increase the BI Rate to 6.75% without intervention but if the situation

	deteriorated, we wanted to raise again the BI Rate to 6.75% with FX intervention. This is a solution to solve the problem of a higher global interest rate and declining global growth.
<i>Instructor:</i>	I am curious why you chose not to intervene.
<i>Participant:</i>	There are two ways to intervene, namely to buy or sell US dollars. If you buy dollars, your currency will depreciate and negatively affect price stability (inflation) through pass through. If you sell dollars, it would decrease foreign exchange reserves and under tighter global financial conditions it would also be negative for your position. For those reasons, we did not offer any FX intervention.

Instructor:

We have finally reached the conclusion of our four-day international workshop. From the presentations, we are quite happy because the message has been well delivered that policies involve trade-offs. Juggling these trade-offs is the day-to-day business of central banks. I hope you have gained knowledge and insights from this four-day workshop but most importantly, you have gained friends from all over the world. There is a Persian saying '1000 friends are not enough; one enemy is too many'. We all need more friends. For our colleagues from other domestic institutions, including the Fiscal Policy Office, MOF and Deposit Insurance Corporation (LPS), thank you very much for your participation. Please tell your colleagues good stories about this program and hopefully next year we can invite more of your colleagues. To our colleagues from other central banks, I would like to express sincere appreciation from Bank Indonesia for coming all the way from your respective countries to Jakarta.

On behalf of Bank Indonesia, thank you.

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